October, 1946

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EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

August, 1945-1946

SOURCE AND DISPOSAL OF ENERGY—MONTH OF AUGUST

	1946	1945	%
GENERATION* (Net)			
By Fuel Burning Plants	13,382,537,000	12,280,123,000	+ 9.0
By Water Power Plants	6,128,651,000	6,344,453,000	− 3.4
Total Generation	**19,511,188,000**	**18,624,576,000**	**+ 4.8**
Add—Net Imports Over International Boundaries	161,155,000	145,054,000	+11.1
Less—Company Use	126,003,000	122,567,000	+ 2.8
Less—Energy Used by Producer	289,460,000	265,903,000	+ 8.9
Net Energy for Distribution	**19,256,880,000**	**18,381,160,000**	**+ 4.8**
Losses and Unaccounted for	2,783,279,000	2,242,507,000	+24.1
Sales to Ultimate Customers	**16,473,601,000**	**16,138,653,000**	**+ 2.1**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of August 31st			
Residential or Domestic	29,227,536	27,896,075	+ 4.8
Rural (Distinct Rural Rates)	1,330,013	1,203,626	+10.5
Commercial or Industrial:			
Small Light and Power	4,610,645	4,301,807	+ 6.7
Large Light and Power	172,035	179,404	
Other Customers	119,186	116,543	+ 2.3
Total Ultimate Customers	**35,459,415**	**33,697,455**	**+ 5.2**
KILOWATTHOUR SALES—During Month of August			
Residential or Domestic	2,899,788,000	2,611,526,000	+11.0
Rural (Distinct Rural Rates)	547,546,000	477,778,000	+14.6
Commercial or Industrial:			
Small Light and Power	2,815,112,000	2,496,860,000	+12.7
Large Light and Power	8,953,140,000	9,146,882,000	− 2.1
Street and Highway Lighting	168,145,000	161,305,000	+ 4.2
Other Public Authorities	467,755,000	632,045,000	−26.0
Railways and Railroads:			
Street and Interurban Railways	351,679,000	346,232,000	+ 1.6
Electrified Steam Railroads	219,888,000	215,821,000	+ 1.9
Interdepartmental	50,548,000	50,204,000	+ 0.7
Total to Ultimate Customers	**16,473,601,000**	**16,138,653,000**	**+ 2.1**
Revenue from Ultimate Customers	**$286,945,200**	**$275,021,900**	**+ 4.3**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ended August 31st			
Kilowatthours per Customer	1,300	1,197	+ 8.6
Average Annual Bill	$42.64	$41.42	+ 2.9
Revenue per Kilowatthour	3.28¢	3.46¢	− 5.2

(*) By courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 14 OCTOBER, 1946 No. 10

EEI Committees Work — Grey Matter And Honest Sweat

EEI Committees work. Mixing grey matter with honest sweat, they work to help the electric industry provide adequate, dependable, high-quality electric service with ever-improving efficiency.

Out of EEI committee meetings have come reduced insurance rates, to save millions of dollars annually for the electric utility industry . . . safety practices that have reduced accident rates wherever electricity is sold in the United States . . . promotional campaigns that have helped make new appliances a necessity in millions of homes . . . engineering developments that have improved operating efficiency in generation, transmission and distribution . . . simplified accounting technique to economize on money, time and scarce man-power . . . all of which were the result of a meeting of minds in the committee room, and follow-up aggressive action, usually through the medium of the trade association.

Every function of the trade association is built around the work of the committees. Each year since 1885, when NELA, predecessor of EEI, was organized, committees representing all departments of the electric industry have grappled with the problem of continually advancing the electric art, to assist member companies in providing their customers with dependable, adequate electric service, produced and distributed with ever increasing efficiency, and sold at fair prices.

Some 50 committees with 600 members are now operating, in a never-ending investigation and attempt to improve almost every type of operation engaged in by the utility company. The value of their work, if measured in the cost of time spent on these projects by the committee members, is very high . . . but if measured in the practical benefits of committee projects to both the public and the industry, it is far higher still.

The Committee Members

It would be difficult to name an outstanding executive in the utility industry today who has not, at one or more times during his career, served on a trade association committee. EEI committee rosters list not only leaders in their own companies, but the men known throughout the industry for their marked ability in their special fields. The training and experience of committee work have proved beneficial to the member himself, as well as to his company.

The new committee member, for example, may at first consider that his appointment means simply more hard work; much of which must be done after hours. It means trips to meetings, days away from home, to sit around a table and develop projects that sometimes may not be completed for years. It means the expenditure of much time and effort, for which, seemingly, he is not repaid.

GROVER C. NEFF

Chairman, Board of Directors, EEI. Mr. Neff is also President of the Institute, and President of the Wisconsin Power & Light Company.

But he soon realizes that he has been handed an opportunity to serve an entire industry, rather than one company only . . . that here is a chance to extend his knowledge, to make helpful friendships, to pick up suggestions from other committee members that will be of practical aid in his every-day work.

His company almost invariably finds that committee membership increases the working efficiency of the man himself—that the varied experience he gains, in the give and take of committee deliberations, is exceptionally valuable training for more responsible positions. The information on other companies' methods that he can bring back will be accurate, up to date and proven successful, ready for profitable use by his own company.

As reconversion proceeds, and long-awaited equipment begins to roll off production lines, the value of committee work to the public and the industry will be substantially increased. With wartime restrictions removed, the pace of committee activity is quickening, and an active year lies ahead.

Plans and studies, compiled during the year, are being put to use, and their results checked; foreign contacts are being re-established; important new projects, made feasible by gradual easing of shortages, are listed on almost all committee agendas.

The Board of Directors is the governing body of the Institute, its Chairman being the President of the Institute.

Composed largely of chief executives of member companies, the Board elects the officers of the Institute, sets the policies of the Institute and supervises their execution, consulting as occasion may require, with the Advisory Committee on matters broadly affecting the whole electric utility industry.

The Board of Directors directs all activities of the General Committees, and also exercises supervision over the operations of the Accounting, Commercial and Engineering Divisions.

A subcommittee of the Board of Directors on Codes and Standards, headed by H. B. BRYANS of the Philadelphia Electric Company, directs activities relating to standards, codes and other technical regulations, especially the relations of the Electric Light and Power industry with other associations and rule-making bodies. This subcommittee also supervises the activities of representatives of the electrical industry on the inter-industry committees in which the telephone, telegraph, railroad and other industries are represented for consideration of joint problems.

H. B. BRYANS

Chairman of the Codes and Standards Committee — Executive Vice-President, Philadelphia Electric Company, Philadelphia, Pa.

Activities planned for the coming year by the Institute's General Committees, and the committees of the Commercial Division, are described on the following pages. Next month's BULLETIN will feature the plans of the Accounting and Engineering Committees. The diversified nature of these projects, and the many benefits which will be derived from them, should make these articles of interest and value to all utility executives, general and departmental.

GENERAL COMMITTEES OF THE INSTITUTE

The General Committees, like some Engineering Committees, have continuing functions, that deal with matters of perennial interest to the electric light and power industry. All General Committees report directly to the Board of Directors of the Institute.

Membership Committee

The Membership Committee is led by J. F. FOGARTY of the North American Company. This committee examines applications for membership in the Institute and reports its recommendations to the Board of Directors.

J. F. FOGARTY

Chairman of the Membership Committee—Chairman of the North American Company, New York, N. Y.

Accident Prevention Committee

The Accident Prevention Committee, with D. C. STEWART of the Niagara Hudson Power Corporation as Chairman, has as its primary objective the prevention of accidents in the industry. The Committee plans to continue collecting information regarding major injuries that occur, analyzing such data to determine the cause of accidents, and formulating recommendations to prevent recurrence of similar injuries. Standing subcommittees deal with specific aspects of accident prevention, such as statistics, protective equipment, resuscitation, etc.

Annual reports listing all fatal accidents during each year, which include an analysis of the causes and preventive recommendations, are an important part of this committee's work. Another outstanding activity to be continued during the next year is the committee-sponsored Speakers' Bureau, which furnishes qualified safety personnel to address conventions and other group meetings, on accident causes and constructive action for their prevention.

H. K. BRECKENRIDGE

Chairman of the Industrial Relations Committee—Assistant to the president of West Penn Power Company, Pittsburgh, Pa.

Industrial Relations Committee

The Industrial Relations Committee, led by H. K. BRECKENRIDGE of the West Penn Power Company, operates as a clearing house for information on all phases of industrial relations policies, procedures and their results. The committee plans to conduct studies of wage rates, collective bargaining, contracts and industry practice on such matters as pensions, welfare activities, vacation plans and other employee benefits. Monthly meetings will be held in various sections of the country for interchange of information on recent developments in these programs.

New personnel techniques designed to improve the employee-management relationship, developments and trends in relations between electric companies and unions, and the application and interpretation of labor laws, which affect the employee-management relationship, will be discussed by the committee throughout the year.

Insurance Committee

The Insurance Committee, with J. H. NICKELL of Philadelphia Electric Company serving as Chairman, keeps informed on insurance rates and coverage for various kinds of insurance, and assists member companies in this field. During the coming year, the committee plans to collect fire loss statistics in such form as to be of the greatest benefit in surveying fire insurance rates, and will regularly report such data to the companies. The committee will also study welfare practices of utilities in relation

J. H. NICKELL

Chairman of the Insurance Committee—Insurance Manager of the Philadelphia Electric Co., Philadelphia, Pa.

to group life, group accident and health insurance, pension plans, etc., to determine the desirability of making a special report on these subjects.

The steps taken by rating and regulatory bodies before expiration of Public Law 15 on Jan. 1, 1948, and its effect on insurance requirements of utilities, will be carefully investigated by the committee. Close contact with insurance regulatory and rating organizations and insurance carriers will be continued for mutual benefit.

Statistical Committee

The Statistical Committee, with WINSOR MARTIN of the Public Utility Engineering and Service Corporation serving as Chairman, will resume issuing the annual questionnaire, which was discontinued during the war. The questionnaire will be kept as much in conformance with the FPC Questionnaire No. 1 as is possible.

The committee is studying plans to widen progressively the scope of its statistical studies, in an attempt to increase still further the value of its reports to the industry. Peak load information, for example, will be requested month by month, according to present plans. An effort will be made to increase the distribution of the annual Statistical Bulletin, to reach a broader and more diversified audience.

The committee will also study the possibilities of a more extensive interchange of statistical information, studies and analyses regularly compiled by individual companies. Under this plan, reports made by one company, which may be of interest to the industry as a whole, will be forwarded to the committee, reproduced and distributed to member companies.

WINSOR MARTIN

Chairman of the Statistical Committee—Manager, Division of Statistics and Reports, Public Utility Engineering and Service Corp., Chicago, Ill.

Transportation Committee

The Transportation Committee is the most recently organized General Committee of the Institute. Under Chairman JEAN Y. RAY, of the Virginia Electric and Power Company, this committee will work in close collaboration with the Motor Vehicle Committee of the American Gas Association on all problems of motor vehicle operation and maintenance encountered by utilities.

Standing subcommittees are being organized to cover such important matters as chassis selection and application, body standardization, tools and equipment, maintenance, fuels and lubricants, and personnel training.

Standard specifications for chassis will be developed for the industry, with particular attention being paid to wheelbase and cab-axle dimensions. This will make it possible to transfer the body from one chassis to another, with considerable savings to the company, since the chassis wears out before the steel body.

Recommended layouts for shops and garages, new and improved maintenance practices, reports on the performance of new truck models, recommendations for fuels and lubricants, and training programs for drivers and mechanics, will all be prepared and disseminated by the committee.

A utility fleet operators' conference, to be sponsored jointly by the EEI-AGA Committees, will be held in Cleveland on April 14-15, 1947. The two-day program will offer authoritative speakers, the presentation of committee reports, and ample opportunity for interchange of information.

JEAN Y. RAY

Chairman of the Transportation Committee — Head of Motor Vehicle Department, Virginia Electric and Power Company, Richmond, Va.

Rate Research Committee

The Rate Research Committee, led by Chairman E. N. STRAIT of the Public Utility Engineering and Service Corporation, will continue to study and report on all matters pertaining to rates, as they may affect the utility industry. This involves examination and discussion of all principles of rate-making, including such matters as the fundamental factors of cost and service, value of service, practical development of rate schedules, relationship of rates to sales development and vice versa, and rules and policies in relation to rate application. It involves also study of regulatory practices, including commission and court decisions relating to the industry.

Standing subcommittees will carry on intensive research into specific aspects of the rate situation, especially those mat-

E. N. STRAIT

Chairman of the Rate Research Committee—Manager, Rate and Research Division, Public Utility Engineering & Service Corp., Chicago, Ill.

ters relating to standby and auxiliary service, power factor correction, demand time-intervals, rules and regulations highway lighting, indoor climate, lighting under industrial rates, and electric welder service. A number of other matters are being considered for study during the coming year, such as profit sharing and sliding scale rate plans. Special reports on committee studies will be issued when practical.

Among its other duties, the Rate Research Committee supervises the publication of the Edison Electric Institute Rate Book.

Prize Awards Committee

The Prize Awards Committee, whose Chairman is H. M. SAWYER of the American Gas and Electric Service Corporation, is planning a careful examination of the bases for all awards administered by the Institute, in the light of present conditions.

H. M. SAWYER

Chairman of the Prize Awards Committee — Vice-President of the American Gas and Electric Corp., Poughkeepsie, N. Y.

While most prize awards were suspended during the war, several have now been reinstated.

These include the George A. Hughes Award, for the company developing the best electric range market; the Thomas E. Martin Award, for the company doing the best work in promoting farm electrification; the Laura McCall Award, for the utility whose home service activities are considered outstanding. Other awards are expected to be resumed during 1947.

COMMITTEES OF THE COMMERCIAL DIVISION

The Commercial Division, which has as its goal the stimulation of sales in all phases of the electric light and power industry's economy, is preparing for the sharply competitive market which is expected as growing numbers of appliances appear on the market. Under the leadership of RALPH P. WAGNER of New York Power and Light Corporation, who is the Chairman of the Commercial Division General Committee, the Division is preparing a fund of informative data and promotional materials for a load building effort on scores of appliances and electrical applications into homes and industries.

RALPH P. WAGNER

Chairman of Commercial Division General Committee— Commercial Manager of New York Power and Light Corp., Albany, N. Y.

For efficient organization, the Commercial Division is set up in four sections, each with its Chairman, and each dealing with a major phase of utility sales. Numerous committees operate within each section on designated subjects under the Section Chairman. Two other Commercial Division committees (Wiring and Sales Personnel and Training) report directly to the Commercial Division General Committee Chairman.

Commercial Sales Section

The Commercial Sales Section, with J. S. SCHUCHERT of the Duquesne Light Company serving as Chairman, is concerned with the commercial market for electric service, which includes stores, offices, schools, food service establishments and institutional buildings—in short, all sales areas regardless of size, other than those obviously covered by the industrial, farm and residential markets. Committee assignments are classified by applications of work. At present the Commercial Sales Section consists of five committees.

J. S. SCHUCHERT

Chairman of Commercial Sales Section—Manager of Commercial Sales of Duquesne Light Company, Pittsburgh, Pa.

H. B. GOULD

Chairman of the Commercial Lighting Committee—Commercial Manager of the Youngstown Division of the Ohio Edison Company, Youngstown, Ohio.

Commercial Lighting Committee

The Commercial Lighting Committee, under Chairman H. B. GOULD of the Ohio Edison Company, plans to develop a "Planned Lighting Program" on a nation-wide basis, and will include the preparation of suitable promotional material by EEI. Market opportunities for the lamp manufacturer, lighting equipment manufacturer, distributor, contractor and the electric company in the sale of planned lighting installations will be investigated. The committee plans to study sales methods and sales promotional programs of all branches

of the industry which have been proven successful in the commercial lighting field, and will report on outstanding methods.

The committee will also cover the technical aspects of commercial lighting, including lighting equipment developments and lighting applications. Articles on this phase of load building will be prepared for the trade press, and cooperation with the Better Light-Better Sight Bureau, the Illuminating Engineering Society and other trade groups will be emphasized.

Commercial Cooking Committee

The Commercial Cooking Committee, with W. G. PARRY of the New Jersey Power & Light Company as

W. GRANT PARRY

Chairman of the Commercial Cooking Committee—Commercial Manager of the New Jersey Power and Light Company, Dover, New Jersey

Chairman, will make continuous market studies and surveys of distribution and merchandising problems in the field of commercial electric cooking. Programs for developing this market, analyses of the competitive phases, and studies of sales methods, promotional programs and personnel practices will all be developed.

"Planned Commercial Kitchen Layouts" to be furnished utility companies for their guidance will be another feature of this committee's activities. Continuous market studies and surveys of commercial electric cooking and baking installations will be made, and results reported to the industry. The servicing problem will be given intensive study.

Commercial Heating and Motor Applications Committee

The Commercial Heating and Motor Applications Committee, with P. D. LAWRENCE of the Virginia Electric &

P. D. LAWRENCE

Chairman of the Heating and Motor Applications Committee—Commercial and Industrial Director of Virginia Electric and Power Company, Richmond, Virginia.

Power Company serving as Chairman, plans an analysis of year-round air conditioning, with special emphasis on the heat pump, which will include studies of equipment, market opportunities, rates, sales methods and promotional programs. Possible applications for germicidal lamps in restaurants, food stores, schools and offices will be carefully studied.

Electric heating, including water heating, spot and strip heating, infra-red and electronic heating, will be analyzed from the viewpoint of profitable applications in the commercial field. Refrigeration will be another important field for study by this committee, with emphasis placed on the distribution of frozen foods, locker plants, and other new developments.

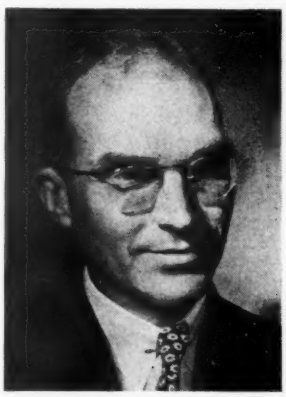
BRUCE JENSEN

Chairman of Street Lighting Coordination Committee—General Lighting Representative of the Public Service Electric & Gas Company, Newark, N. J.

Market Development Committee

The Market Development Committee, with E. B. HASKELL of the United Illuminating Company as Chairman, will be concerned more with the commercial market in a broad sense than with the study of specific equipment or applications. The development of good will and improved public relations in the commercial field will receive special consideration by this committee, as will sales research, including market analyses and customer load research. Particular attention will be given to the problem of effectively disseminating the results of sales research work to executives, as well as to men in the field.

General sales operating procedures, including methods of sales control and customer record systems; specific operating methods, including daily reports, evaluation of salesmen's performance, and allied problems, will also be considered by this committee. Methods used in handling service responsibilities, contracts, etc., and sales promotional methods considered in a general sense, are listed on the committee's agenda.



E. B. HASKELL

Chairman of Market Development Committee—Industrial and Commercial Manager of the United Illuminating Company, New Haven, Conn.

Street Lighting Coordination Committee

The Street Lighting Coordination Committee, led by Chairman BRUCE JENSEN of the Public Service Electric & Gas Company, will be responsible for coordinating the promotional and technical work of the industry in this field with that of National Electrical Manufacturers' Association, the Illuminating Engineering Society and individual manufacturers. Technical and promotional data on street lighting, with

suggestions for profitble use, will be disseminated among member companies.

Comparisons of operating methods and experiences, rates, breakage and other pertinent information will be prepared by the committee. Careful consideration will be given to possible national action by the utility industry to help solve some of the general street lighting problems and to assist individual companies with specific local problems.

Farm Section

The Farm Section, headed by Chairman E. C. EASTER of the Alabama Power Company, is planning on an exceptionally active year, in keeping with the drive of the electric power industry to bring electricity to almost all farmers by the end of 1948. Five committees have been set up, and important projects are scheduled for each.

Already in preparation as a Section project is a Farm Electrification Manual, which is patterned after the well-known Power Sales Manual, and is planned to bring the rural representative the up-to-date, thorough information on farm applications of electricity that he will require, in order to increase the number of profitable uses of electricity on farms in his territory. It is expected that the Manual will be ready within the next few months, with additional sections to be issued periodically.

The Section is also encouraging the formation of state farm electrification councils, which bring together all groups interested in farm electrification, and form programs to sponsor research and teaching in this field. A soil conservation program for the electric industry is now in process of preparation, and one company is at present actually engaged in this work.

E. C. EASTER

Chairman of the Farm Section —Manager of Rural and Towns Division, Alabama Power Company, Birmingham, Ala.

In-Service Training Committee

The In-Service Training Committee, headed by Chairman JOHN L. BURGAN of the New York State Electric & Gas Corporation, is preparing a training course in farm electrification for agricultural workers such as Agricultural Extension personnel. Vocational-Agricultural and home economics teachers, and others. The course is expected to be ready for distribution early in 1947.

This training course is expected to prove exceptionally valuable in extending knowledge of farm electrification among the above agencies, to whom farm people have for many years looked for guidance, in all matters pertaining to farm operations.

JOHN L. BURGAN

Chairman of the In-Service Training Committee — Director of Rural Development, New York State Electric and Gas Corp., Ithaca, New York.

Equipment Distribution Committee

The Equipment Distribution Committee, with J. C. CAHILL of The Detroit Edison Company serving as Chairman, will study the distribution methods used in connection with electrical farm equipment in various sections of the country. In this project, the committee plans to stress a careful analysis of practices now employed with productive farm equipment, as well as those used with residential appliances.

Cooperation among the utility and dealers in promotional programs on farm equipment; what the manufacturer can do to improve equipment distribution, and the servicing, selling, installing and financing of electrical equipment for the farm, are other subjects for consideration and report by this committee.

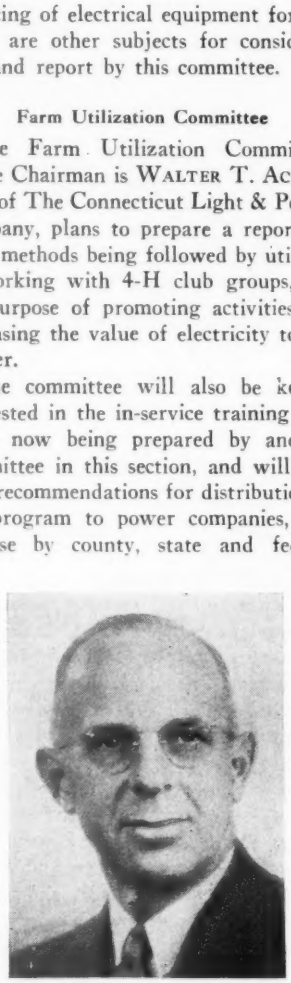
J. C. CAHILL

Chairman of the Equipment Distribution Committee—District Coordinator of the Detroit Edison Company of Detroit, Mich.

Farm Utilization Committee

The Farm Utilization Committee, whose Chairman is WALTER T. ACKERMAN of The Connecticut Light & Power Company, plans to prepare a report on those methods being followed by utilities in working with 4-H club groups, for the purpose of promoting activities for increasing the value of electricity to the farmer.

The committee will also be keenly interested in the in-service training program now being prepared by another committee in this section, and will prepare recommendations for distribution of the program to power companies, and its use by county, state and federal



W. T. ACKERMAN

Chairman of the Farm Utilization Committee—Farm Service Director of the Connecticut Light & Power Company, Waterbury, Conn.

groups who are concerned with farm electrification.

Agricultural Development Committee

The Agricultural Development Committee, whose Chairman will be announced in the near future, is the newest Farm Section committee. It was created because of the increased interest of power companies in agricultural development, which includes the improving of farming methods, livestock, and other phases of farming which have both a direct and indirect influence on the use of electricity by customers.

The committee is planning an agricultural development clinic, to be held in January, 1947, at which an exchange of ideas among companies now sponsoring agricultural development programs will be featured. A comprehensive handbook designed to guide power companies in organizing this type program is now in preparation.

Service Extension Committee

The Service Extension Committee, led by Chairman R. G. WALTER of the Wisconsin Power & Light Company, will investigate the problems encountered in making adequate provisions for present loads, and expected future loads, on rural electric lines.

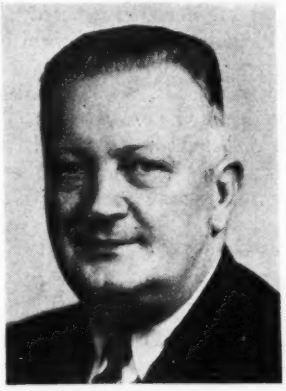
The more important operating characteristics of farm loads, transformer capacities permissible without penalty on farm lines, and the question of "when does a residence and farm become a commercial or residential customer?" are among the other important subjects to be studied by this committee.

R. G. WALTER

Chairman of the Service Extension Committee—Vice President in charge of Operations of the Wisconsin Power and Light Company, Madison, Wisconsin.

Industrial Power and Heating Section

The Industrial Power and Heating Section, with CHARLES SNYDER of the Monongahela Power Company serving as Chairman, has set up four regular committees, and several special committees for specific tasks. In addition to the work of its committees, which are described in detail below, the Section is producing new and revised Power Sales Manual sections on Motor Applications and Control, Industrial Cooking and Industrial Lighting, to be available during the coming months. A supplement on Commercial Frequency Induction Heating will be added to the present Induction Heating Section. Present Manual sections on Industrial Refrigeration, Infra-Red Heating and Induction Heating will be revised, in the light of present conditions.



CHARLES SNYDER

Chairman of the Industrial Power and Heating Section—New Business Manager of the Monongahela Power Company, Fairmont, West Virginia.

Another project is the preparation of a comprehensive study on Electrical Transportation. Data on new uses, market surveys, competition and other phases of industrial power will also be made available to the industry during the coming year.

General Power and Heating Committee

The General Power and Heating Committee, with ROBERT G. ELY of the Pacific Service Electric & Gas Company as Chairman, will study and report on all industrial uses of power, such as motor applications and controls, industrial refrigeration, air conditioning and ventilation, heat treating, melting, welding and high frequency heating. New equipment using electric power that is developed within specific industries will be closely followed.

R. G. ELY

Chairman of the General Power and Heating Committee—Assistant General Power Representative of the Public Service Electric & Gas Company, Newark, New Jersey.

Opportunities to increase kilowatthour sales in the industrial market will be investigated, and the major electrical problems of customers will be carefully studied.

Competitive Service Committee

The Competitive Service Committee, under Chairman MAXWELL COLE of the Philadelphia Electric Company, will collect, digest and disseminate to the industry pertinent information regarding competitive power and related situations. Among the subjects to be considered by this committee are the development and marketing of new power equipment, prime movers, boilers, etc.; the development of information on fuels

MAXWELL COLE

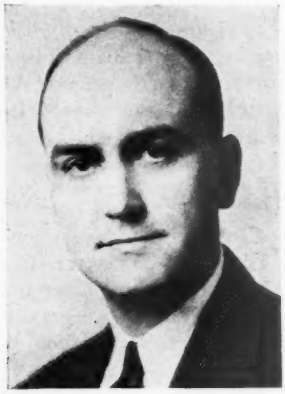
Chairman of the Competitive Service Committee—Manager of Market Studies and Service Division of the Philadelphia Electric Company, Philadelphia, Pennsylvania.

and fuel costs, labor costs, insurance rates, taxes, and similar factors effecting power competition.

A continuing study will be made of fuel costs and other factors which affect heating competition, either space or process, by this committee.

Industrial Lighting Committee

The Industrial Lighting Committee, whose Chairman is FRANK MUELLER of The Cleveland Electric Illuminating Company, will make continuing studies as Chairman, has set up four regular and periodic reports on all developments in the industrial lighting field. Methods of improving applications of lighting to industrial processes, new uses for fluorescent and cold cathode lighting, and successful lighting techniques to meet specific problems encountered in individual plants will be developed, and



FRANK MUELLER

Chairman of the Industrial Lighting Committee—Industrial Specialist of the Cleveland Electric Illuminating Company, Cleveland, Ohio.

results reported to the industry.

Market opportunities existing for higher levels of lighting, improved sales methods in industrial lighting, and case histories of successful industrial lighting sales promotional programs are other important subjects that will be considered by this committee.

Industrial Training Committee

The Industrial Training Committee, with SHERMAN R. KNAPP, of the Connecticut Light & Power Company serving as Chairman, will complete the Industrial Sales Training Handbook, which is expected to prove itself exceptionally valuable in providing the intensive, up-to-date training required for successful selling in the sharply competitive industrial market. Industrial sales

S. R. KNAPP

Chairman of the Industrial Training Committee—Assistant to the Vice-President of the Connecticut Light and Power Company, Waterbury, Conn.

managers are looking forward to the aid this handbook will give them in creating competent salesmen out of their many new recruits, and increasing the productivity of their sales staffs.

Several handbook sections have already been completed, and will soon be ready for distribution.

Residential Section

The Residential Section of the Commercial Division, which is headed by Chairman J. M. STEDMAN of the Pennsylvania Power & Light Company, is preparing to assist member companies in load building programs directed toward every part of the residential market. As growing numbers of appliance reach the retail outlets, the problems facing residential sales managers can be expected to grow progressively more difficult, and

J. M. STEDMAN

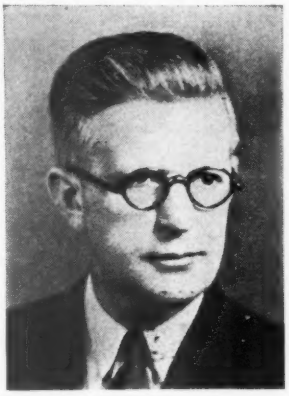
Chairman of the Residential Section—General Commercial Manager of the Pennsylvania Power and Light Company, Allentown, Pennsylvania.

the market become more competitive.

The six residential committees have prepared extensive programs designed to aid residential sales staffs by providing them with sales ammunition in the form of promotional materials, market data, information on competition, and other sales aids that will be required for successful operations during 1946-1947.

Dealer Coordination Committee

The Dealer Coordination Committee, under Chairman HUGH G. ISLEY of the Carolina Power & Light Company, has for its scope of activity the consideration and collation of methods and plans used by electric power companies to improve results in dealer relations, and increase residential appliance sales through dealer cooperative programs. The committee will also study and give suggestions on



H. G. ISLEY

Chairman of the Dealer Coordination Committee—General Sales Manager of the Carolina Power and Light Company, Raleigh, North Carolina.

the use of successful organization and promotional plans and programs.

The committee will establish a clearing-house on all matters pertaining to dealer coordination, such as organizational plans, policies and methods, as a continuing project throughout the year. Among subjects to be considered are prospect distribution to cooperating retailers, displaying of the retailers' appliances in utility commercial offices, and securing the dealers' cooperation in making out of sales reports. The committee plans to institute a "Dealer Coordination Exchange," for the dissemination of this information to member companies.

Electric Kitchen and Laundry Committee

The Electric Kitchen and Laundry Committee, with J. S. SUTHERLAND of the Alabama Power Company serving as

Chairman, will include on its agenda all matters of industry promotion to capitalize on the heavy interest in planned modern electric kitchens and laundries.

The committee hopes to complete a unified program suitable for support by the entire industry, in order to meet the strong competition in the planned kitchen field. The program, it is planned, will include advertising and promotional material on this subject, which will be distributed to individual companies. The committee may also distribute and suggest local support of outstanding promotional programs originated by publications for use in this field, and hopes to use appropriate materials prepared by member companies that may be suitable for national use.

Electric Water Heating Committee

The Electric Water Heating Committee, headed by Chairman H. P. MEGARGEE of the American Gas and Electric Service Corporation, plans to study and suggest to member companies the most effective promotional methods for increasing sales of electric water heaters. The committee has noted a greatly expanded market for this service, and an increased number of companies now interested in such promotion, as compared with pre-war experience.

The committee will prepare general recommendations on tank sizes required for various family needs, and also on mechanical details, such as standardized specifications and safety control devices, which will be of particular assistance to those companies aggressively entering the water heater market.

The committee plans to work with the Electric Kitchen and Laundry Committee, so as to assure the proper inclusion of electric water heating service in the plans of the latter committee for promotion of electric kitchens and laundries.

Home Service Committee

The Home Service Committee, with Miss FERN SNIDER of the Georgia Power Company as Chairman, plans to disseminate information on all new and effective methods developed to make home service work even more productive in good customer service and residential load building. The committee will continue to publish the "Home Service Exchange," with seven issues scheduled for the coming year. This publication will provide the latest data from Home Service Departments, women's magazines,

MISS FERN SNIDER

Chairman of the Home Service Committee—Home Service Director of the Georgia Power Company, Atlanta, Ga.

home economics educational institutions, etc., on what's new in home service.

Regional Home Service Conferences will be sponsored by the committee, for interchange of information on successful methods used in this field. The "Parade of Demonstration Ideas" will be reinstituted, and will present many of the latest home economic ideas from manufacturers, magazines, utility personnel and others, to all those interested in home service work and in increasing the effectiveness of its results.

Indoor Climate Committee

The Indoor Climate Committee, headed by Chairman E. A. FREUND of the Union Electric Company of Missouri, plans to prepare an extensive report on the electric heat pump, and the latest developments in the use of reverse cycle refrigeration to provide residential

E. A. FREUND

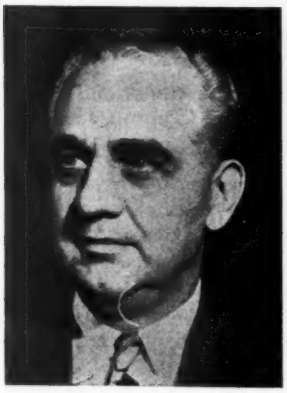
Chairman of the Indoor Climate Committee—Development Engineer of the Union Electric Company of Missouri, St. Louis, Missouri.

heating and water heating. The report, intends to provide specific information on the outstanding results of experiments with the heat pump, particularly in the use of earth as the heating medium.

A preliminary report will list such matters as reference material, descriptions of those research projects now in existence, etc., while the final report of the committee will attempt to draw conclusions and suggest recommendations for the promotion of reverse cycle refrigeration. Although the scope of this committee includes the whole field of residential air-conditioning, it is felt that the proposed reports on the heat pump will be the prime responsibility of this committee for the coming year.

Residential Lighting Committee

The Residential Lighting Committee,



H. A. STROUD

Chairman of the Residential Lighting Committee—Promotion Manager of the Monongahela Power Company, Fairmont, West Virginia.

headed by Chairman H. A. STROUD, of the Monongahela Power Company, will prepare and disseminate worthwhile ideas for the promotion of better and higher levels of illumination in the home. The committee plans to keep abreast of allied programs launched by lighting equipment manufacturers and other agencies interested in the development of home lighting.

The committee plans to recommend member company approval of the Certified Lamp Manufacturers' Program, and expects the program of the American Home Lighting Institute, on certified residential fixtures, will deserve equal support when completed. In addition, the committee intends to develop over-all home lighting promotion to be made available to all member companies. The program will include various types of

R. S. BELL
Chairman of the Sales Personnel and Training Committee—Supervisor of Appliance Sales of the Commonwealth & Southern Corp., New York, N. Y.

advertising and other promotional material.

Sales Personnel and Training Committee

The Sales Personnel and Training Committee which, like the Wiring Committee, reports directly to the Commercial Division General Committee, is headed by R. S. BELL of The Commonwealth & Southern Corporation. The committee has organized two subcommittees, for more efficient handling of its duties.

The Sales Personnel subcommittee, under Chairman E. O. GEORGE of The Detroit Edison Company, is editing job classifications for positions in utility sales or commercial departments, which will serve as guides in assigning duties to sales employees. Methods for improving selection of salesmen are also being studied.

The Sales Training subcommittee, with E. J. FITZGERALD of the Niagara Hudson Power Corporation serving as Chairman, will supervise distribution of the Institute's outstanding Sales Training Course. The committee is considering revision of the present Leaders' Guides, in the light of experience in the field, and the publication of a booklet on methods developed by users of the course for organization and promotion of training classes for dealers and utility employees.

Wiring Committee

The Wiring Committee, which reports directly to the Commercial Division General Committee, has as its Chairman R. F. HARTENSTEIN of the Ohio Edison Company. This committee is preparing an Appliance Installation Manual, which will include the wiring methods and installation practices generally accepted in the industry for major appliances, requiring special in-

R. F. HARTENSTEIN
Chairman of Wiring Committee—Superintendent of Electric & Steam Sales of the Ohio Edison Company, Akron, Ohio.

stallation work. Wiring required by the electric range, water heater, dishwasher and many other major appliances will be covered in this manual, which is being prepared in section form.

Outlines for talks on residential and commercial wiring, using Kodachrome slides, are being prepared for use by utility personnel in addressing building and architect groups. The booklet entitled "Rewiring for Commercial and Industrial Buildings," first published in 1941, is being revised, and is expected to prove helpful in promoting better commercial wiring.

HOUR OF CHARM GIRLS

The 'Hour of Charm' radio program, with Phil Spitalny and his all-girl orchestra, is now sponsored by the group of electric utility companies engaged in a national advertising campaign. The program is heard over the Columbia Broadcasting System each Sunday afternoon at 4:30 P.M., Eastern Standard Time.

Heat Pump Heat Sources

A Survey of the Southern Research Institute Made for the Southeastern Electric Exchange

By E. N. Kemler

Southern Research Institute, Birmingham, Ala.

I. PREFACE

THE Southeastern Electric Exchange, in originally establishing a project at the Southern Research Institute to study the heat pump, had in mind that this problem would consist principally of an evaluation of the practical possibilities of the heat pump applied to residential and commercial heating and cooling. Since this project was set up, great strides have been made by certain manufacturers in developing the heat pump for commercial and residential applications and several units are at the present time actually on the market. This fact has considerably changed the scope and objective of this project. Many of the items originally considered for investigation still need to be studied and will, in fact, be covered in subsequent reports. However, the most urgent need is for study of heat sources. Since the heat pump gives from 4 to 5 Btus output for each equivalent Btu of energy supplied, the question of where to obtain the other 3 or 4 Btus has very great economic interest in the practical application of the heat pump principle.

A review of all available sources of information that might be applied to the calculation or design of a system which utilizes the earth's heat for its operation has been made. It develops that insufficient data are presently available for any reliable studies in this direction and some discussion has been given to possible additional sponsored projects for obtaining the necessary information for the rational application of the heat pump using the earth as a source of heat.

This report can be considered in the nature of a progress report or review of this major problem which must be evaluated if the heat pump is to receive general and widespread acceptance for home and commercial uses throughout the country.

II. INTRODUCTION

The basic problem in planning any heating plant, whether it uses fuel or a heat pump, is an economical and satisfactory source of heat. In considering the heat pump there are three basic sources of heat in nature which can be utilized. These are the air, underground water, and the earth itself. Of course, to these might be added radiant energy from the sun, and local bodies of water such as lakes and rivers. While each of these heat sources offers possibilities, no comprehensive surveys have been made of their scope of application or their limitations. It is certain that no one of these heat sources will best fit all conditions and each local area or region of the country will probably have a best source, or combination of sources. As will be pointed out later, each of the heat sources mentioned has both its merits and disadvantages.

Research work on determining the most reliable and economical means of obtaining heat under the wide variety of general conditions to be encountered is needed promptly if the heat pump is to be commercially applied and is to have widespread acceptance. The heat source which appears to have the most universal application, the earth, has received little general study. The survey of literature on the subject shows that there is little information available on the characteristics of the earth as to its ability to transfer heat. Even such information as is available cannot be used with any degree of reliability or confidence insofar as continued utilization is concerned.

The earth represents an inexhaustible supply of heat at reasonable temperatures when used in connection with a heat pump for year-around comfort air conditioning. This report points out that there are many factors which need to be investigated, however, before a system utilizing earth heat can be satisfactorily designed. The wide variation in the characteristics of the earth's surface, both with regard to composition and climatic conditions, indicates that research of a fundamental nature should be undertaken for the purpose of developing design data and to correlate data already available or rapidly becoming available from actual installations in the field.

III. PURPOSE

The purpose of this report is to collect information available on heat sources for heat pump use, to summarize the work which has been done on determining the capacity of the earth to absorb or give up heat, and to see whether sufficient information is available to permit the rational application of the heat pump when utilizing the earth as a source of heat. It is a further purpose of this report to analyze what needs to be done in a long-range way, indicating some of the uses of this information.

IV. SOURCES OF HEAT

A. Air

One of the universal sources of heat, and perhaps the most common for heat pump usage, is the surrounding air. Because of its convenient and general availability and ease of movement it appears to be at first thought a general answer to the problem. Figure 1 shows the theoretical Carnot cycle heat pump cycle efficiency for 100° delivered air and various air source temperatures. While this efficiency is a theoretical value much higher than can be realized in practice, it does show that the heat pump cycle efficiency drops off rapidly as the source temperature decreases. Since heating requirements increase as the outside temperature drops, the air-to-air unit requires increased size in order to make up for this decrease in efficiency as the output requirements increase. Where heating is the controlling load on the heat pump, and where low outside air temperatures are encountered, the air-to-air unit will require a larger horsepower capacity unit than the water-to-air unit. Where the cooling load imposes the maximum load, the air-to-air unit may not be penalized in this respect.

The air-to-air unit is basically larger in size than the water-to-air unit because the air heat exchanger is larger than the liquid heat exchanger and provision must be made to bring the outside air to, through, and from the unit. Because the temperature drop in the air from which heat is abstracted must be kept low, large volumes of air must be

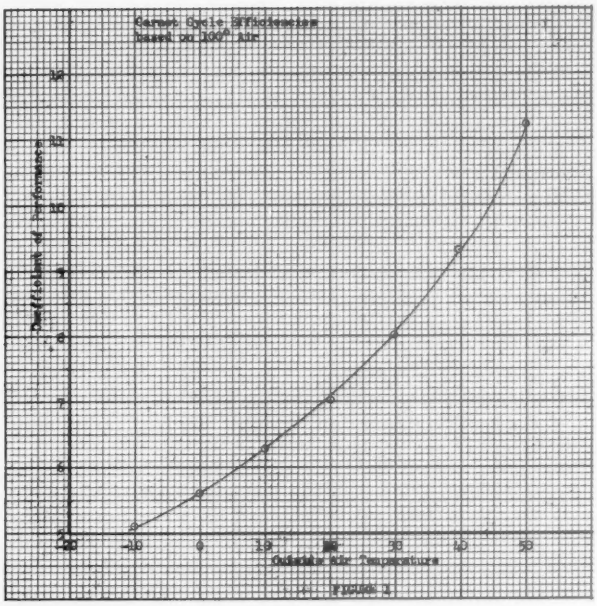


Fig. 1

handled. This introduces noise problems and unless the heating unit is conveniently located to an outside air source will require a considerable amount of power. Figure 2 shows the approximate volumes of air needed with 5° and 10° temperature drops for the heat source in an air-to-air heat pump.

Practical considerations would appear to limit the air-to-air unit to temperatures of from 10° to 20° F. There are, however, many possible modifications of current heat pump cycles which may result in improved performance and capacity for lower temperatures. One factor in favor of air-to-air units is the fact that as the outside temperature increases the performance improves. Experience with commercial installations in southern California has shown that while the coefficient of performance for minimum conditions may be between 3 and 4, the average coefficient of performance as measured over the heating season may be between 5 and 6. This is because so much of the heating is done when the outside air temperature range is from 50° to 70° F., which gives a very high coefficient of performance for this temperature range. The potentialities of the air-to-air heat pump have not been fully realized and many improvements can be expected as experience points out the demand or necessity for such improvements.

B. Ground Water

Ground water as a general source of heat for heat pump operation is not practical unless some means is used to return the water to the underground reservoir. Any general widespread usage of ground water resources without returning them would in most localities result in depletion of these resources and would not be in the public interest. There are specific areas, however, where there are sufficient ground water resources to permit pumping and discarding them. This is particularly true in coastal regions. It is also possible to utilize dual wells so that water can be pumped from one and returned to an-

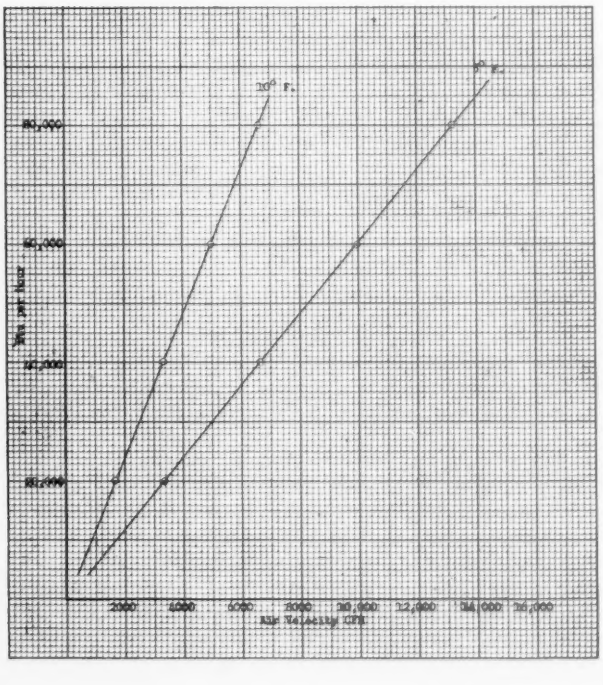


Fig. 2

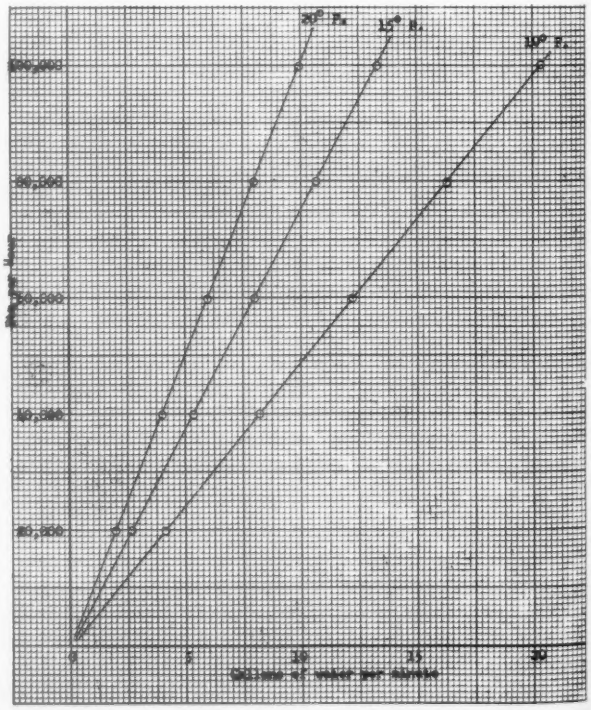


Fig. 3

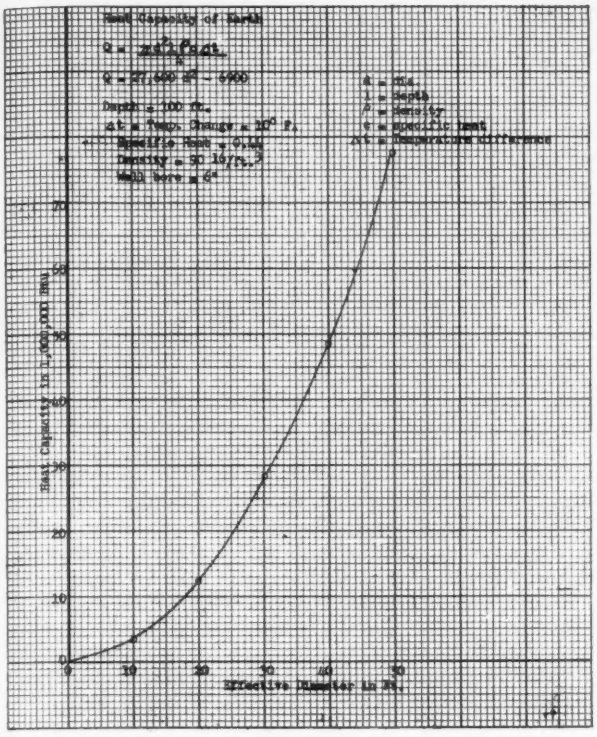


Fig. 4

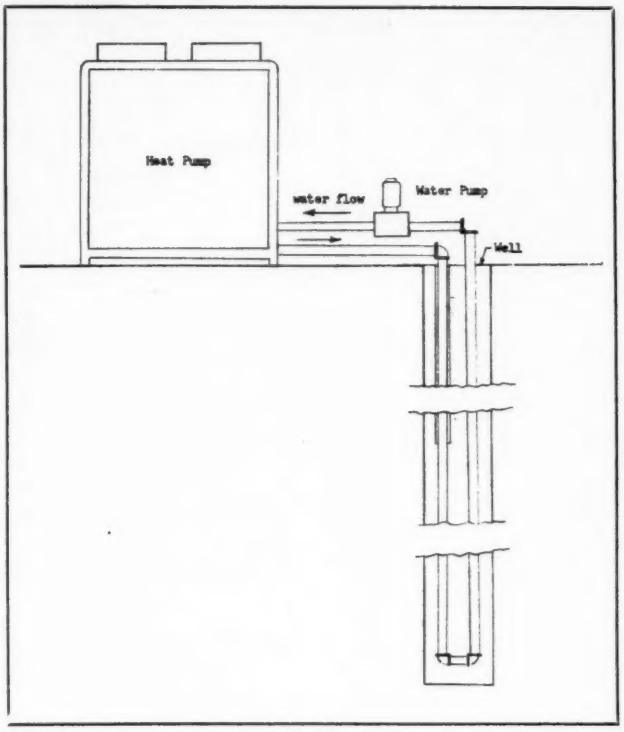


Fig. 5

other. The practicality of this recycling will depend upon local conditions, well spacing, etc. Where there are shallow, thick watersands, this may be a very economical and practical means of obtaining the heat.

The general advantage of utilizing water as the source of heat is the fact that it will be at essentially the same temperature during the entire heating season which results in a more compact unit. By having a uniform source temperature, it is possible to build a unit which can be designed to operate at capacity. It will also operate at this capacity independent of heating requirements, hence is able to deliver at maximum capacity when this capacity is most needed. Thus it will be seen that water as a heat source offers many important advantages. Its most important disadvantage is that it is necessary to first locate an adequate source. Disposal of the water after heat extraction also offers problems in many areas. The few cases or limited areas where ground water is readily available and can be easily disposed of are so limited that this source of heat can not be considered as a general solution.

Figure 3 shows a plot of the approximate gallons per minute of water used for various sizes of heat pump installations for 10°, 15°, and 20° temperature differences. The first figure will generally be about the maximum which can be used in the colder areas of the country. The higher figures may be attained in the Gulf Coast region. Heat exchanger economics and size will also be a factor in determining the temperature difference to be used.

C. Earth

The most universal source of heat which is available is the earth. In order to show the large quantities of heat available for the earth, Figure 4 has been drawn. This figure shows, for example, that a cylinder of earth 30 feet in diameter and 100 feet deep will give up 28,000,000 Btus, if its temperature is lowered only 10° F. If we assume a 100 foot depth and a heat pump unit delivery of 50,000 Btu/hr. operating an average of 20 per cent of the time over a five months heating season, the drop of 10° in a 30 foot diameter cylinder would approximately supply the heat needed for the entire heating season if no heat flowed into the region. There is no question as to the capacity of the earth to supply the heat, the only problem is the mechanism necessary to obtain this heat.

Many schemes have been proposed for obtaining this heat from the earth. Two have been tried out and offer possibilities. One is that proposed by the Muncie Gear Works and shown in Figure 5. In this system a hole is drilled in the ground to a depth so that there will be a fluid level of about 200 feet. A closed U-tube as shown in Figure 6 is inserted in the well. A pump is used to circulate water or other fluid through this pipe to pick up heat from the well which in turn picks up the heat from the ground. The heat is extracted from this fluid in the normal evaporator and the water continues its circulation. This system has many advantages over the circulation of the water itself. The fluid in the U-tube can be inhibited to eliminate corrosion in the heat exchanger system, the utilization of the same fluid eliminates fouling up of the heat transfer surfaces and power requirements are kept to a minimum since the only work done is that necessary to overcome friction in the system. This system has been used in connection with experimental units and is reported to be very satisfactory for heat pump installations. One obvious objection to this system is the expense involved in digging a well. This expense is, however, offset by generally lower operating costs.

A modification of the above system is one in which the water from the well bore is itself circulated in the system. This method would require frequent

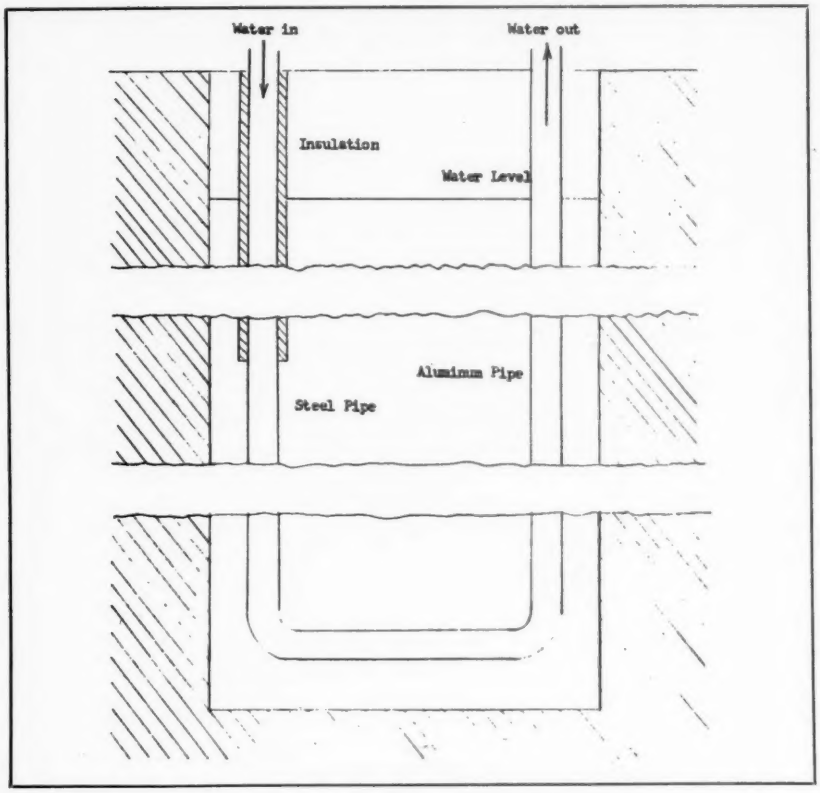


Fig. 6

cleaning of the heat transfer surfaces and would intensify the corrosion problem through continued agitation of the water in the well.

The next type of system which can be used in connection with heat pump installations is that shown schematically in Figure 7. In this system the secondary heat exchanger surface as shown in Figure 6 is now buried in the ground. The fluid is circulated through the pipes as in the case of the well. This system merely substitutes the burying of pipes for the digging of a well. It is not as desirable, however, because of the generally lower temperature during the heating season as will be pointed out in a later section on ground and ground water temperatures.

An obvious modification of the system shown in Figure 7 is to make the pipes serve as the evaporator. This then eliminates one heat exchanger. It does, however, introduce some operating hazards in trapping of oil, leakage of refrigerant, and similar problems which indicate that care will have to be exercised in both design and installation of heat source system.

D. Other Sources

There are many other possible sources of heat, most of which depend upon particular local conditions and have only limited application. However, where they can be utilized, the heat pump installation may be simplified and in many cases where higher temperature sources are available, higher coefficients of performance may be obtained. In Switzerland lakes and rivers have been used as the source of heat for large installations. Other installations have used individual water supplies, waste waters, and combination installations with industrial processes. Where such specialized sources are available, they frequently increase the range of application or performance. They do not, however, fit into the general heat pump problem. A modification of the earth as a heat source would include use of pipes under buildings or around basement walls to trap heat which is lost from the building. Limited quantities of such heat will be available at higher temperatures than heat from the ground.

V. GROUND AND GROUND WATER TEMPERATURES

One of the important factors in the selection of a heat source is the temperature at which the heat can be obtained. The following discussion will present some of the meager data available on ground and ground water temperatures.

Figure 8 shows approximate temperatures of water from wells at depths of from 30 to 60 feet. At these depths, Collins states that there is in general a seasonal variation of not more than about 1 degree. Earth temperatures or ground water temperatures at these depths will generally exceed the mean annual air temperature by two or three degrees and in some localities it may exceed them slightly more than this. From this figure it can be seen that the area served by the Southeastern Electric Exchange utilities will in general have ground temperature at these depths in excess of sixty degrees, and in a large part of the area sixty-five degrees and up. With this high a temperature, allowing a reasonable drop such as five to ten degrees between the mean earth temperature and the fluid used to pick up the heat from the earth, very efficient heat pump operation should be obtained. Where deeper depths are utilized, an increase in temperature of about 1 degree for each 64 feet increase in depth has been indicated and is recommended by Collins. On this basis, therefore, deeper wells would show somewhat higher temperatures than those indicated here.

In the case of the pipes which are

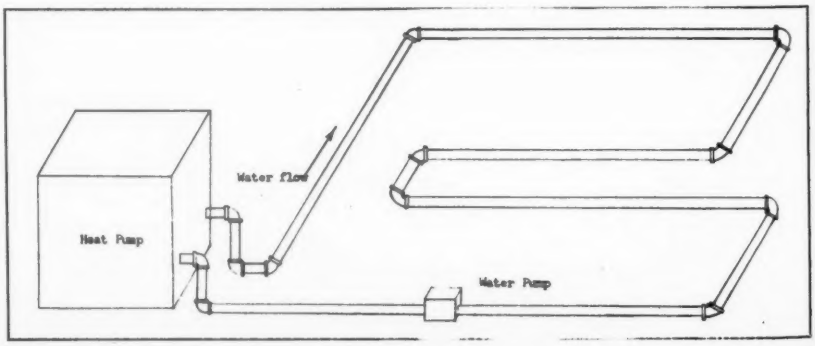
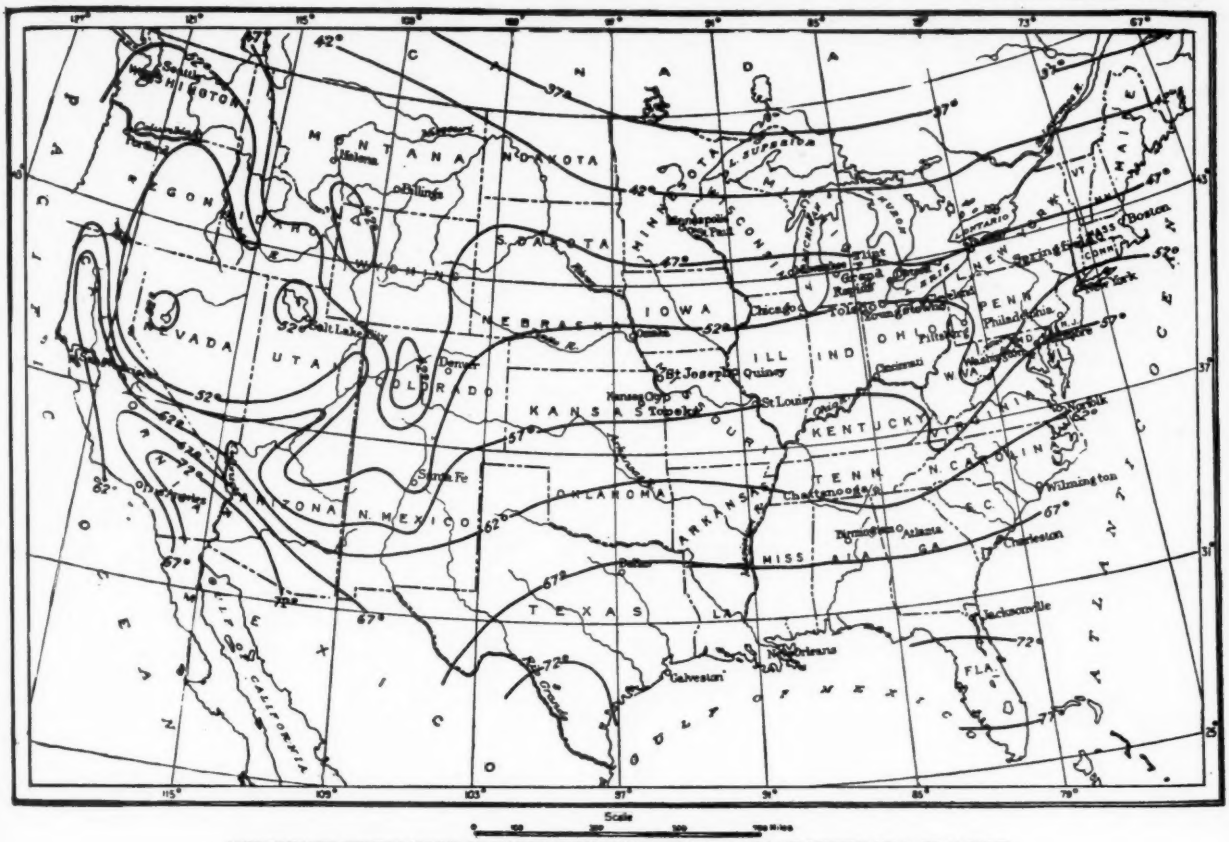


Fig. 7



APPROXIMATE TEMPERATURE OF WATER FROM NONTHERMAL WELLS AT DEPTHS OF 30 TO 60 FEET

Fig. 8

buried in the ground, the temperatures will be somewhat more varied. Figure 9 shows the seasonal variation in soil temperatures at various depths as measured in Pittsburgh in 1941.[5] These temperatures were measured in well drained red clay soil. It will be noticed that as the depth increases, the variation decreases quite considerably. Furthermore, it can be seen from this figure that the minimum soil temperature at any reasonable depth will occur in March which is late in the heating season and will therefore not have as great an effect on heat pump operation as would otherwise occur. Figures 10 and 11 give ground temperatures as measured in Amarillo, Texas, and at Laramie, Wyoming, at 3, 6, and 10 feet depths.[19] Here again, the same general trend was found, namely, that the minimum temperature is not reached until relatively late in the heating season, and that as the depth increases, the variation in underground temperatures decreases quite rapidly. These figures show that for any normal depth to which pipes may be buried the temperatures will fluctuate and will be dependent to some extent on the corresponding atmospheric temperatures, although there will be quite an appreciable lag as depth increases.

Figure 12 is of interest in that it shows air temperatures and corresponding ground surface temperatures taken at Amarillo, Texas. This shows that ground surface temperatures are much higher than atmospheric temperatures when the sun is shining on it. Where climatic conditions permit, it is possible that pipes very near the surface might be utilized to advantage to absorb part of the radiant energy otherwise absorbed by the ground.

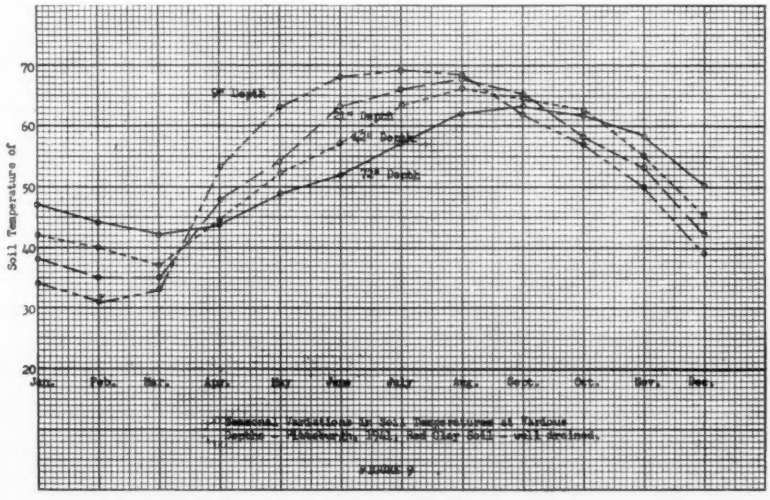


Fig. 9

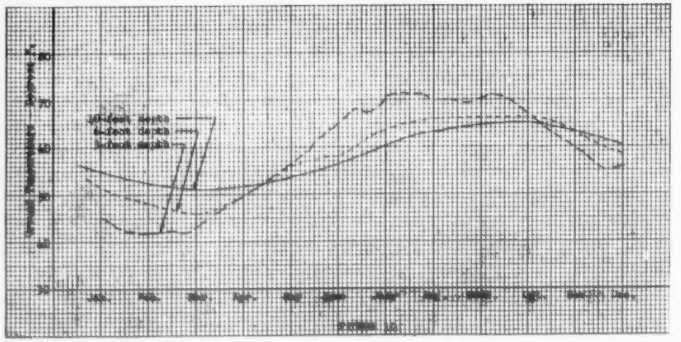


Fig. 10

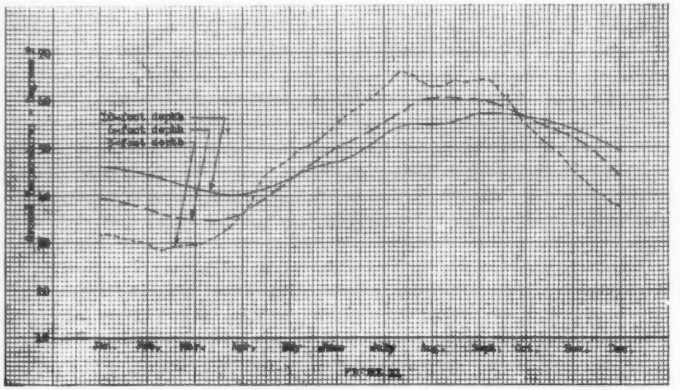


Fig. 11

TABLE I—THERMAL CONDUCTIVITIES OF SOIL AND RELATED MATERIALS

Material	*Density lbs/cu ft*	*K Btu/(hr)(ft)*	*Ref.*
Soil, very light and dry		.21	9
" clay	65.7	.14	6
" "	78.0	.26	6
" "	96.0	.38	6
" "		.8	3
" dry		.08	10
" "		.08	14
" "		.083	9
Soil, norm. cond., excavated—including 127.0 stones 1-3", 68° F.		.30	10
" minimum moisture		.85	9
" mixed soil, heavy fainfall		.73	
" wet, max.		2.62	9
Soil, wet		.39	10
" moist		.83	9
" wet		.39	14
Clay soils, dry		.5	8
" " moist		.9	8
" " moist to wet		1.5	8
" " red clay, well drained, Pittsburgh		.57	5
" " well drained, California		.55	
" " sand damp		.91	9
Sub soil, wet		1.34	9
Sandy soils			
Clay or sand , damp		.91	9
Sandy, dry		.65 .45	8
" moist		1.1	8
" soaked		2.4	8
" moist to wet		1.2	8
River sand, fine, dried, 68° F.	95.0	.19	10
" " normal moisture (11%)	102.4	.65	10
Sand, dry		.224	3
" "		.19	9
" moist		.67	9
Earth's crust		.97	9
Sawdust		.03	14
Diatomaceous earth		.03	14
Granite, limestone, sandstone, etc.		1.25	14
Water		.3-.54	14
Air		.012	14
Air 150° F.		.017	11
Summary			
Soil, dry	66.0	.1-.3	
" average moist		.3-.5	
" soaked		.5-1.5	
Clay soil, dry		.5	
" " moist		.6-.9	
" " wet to soaked		1.0-1.5	
Sandy soil, dry	95.0	.2-.65	
" " moist	102.0	.65-1.2	
" " wet to soaked		1.2-2.4	

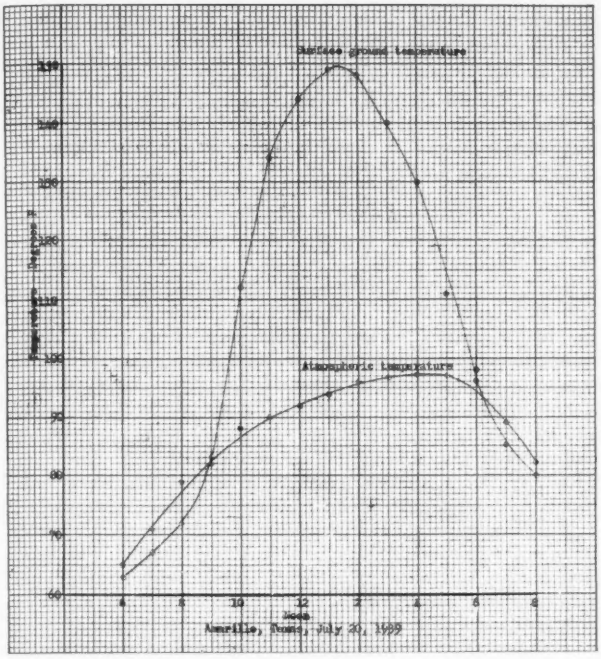


Fig. 12

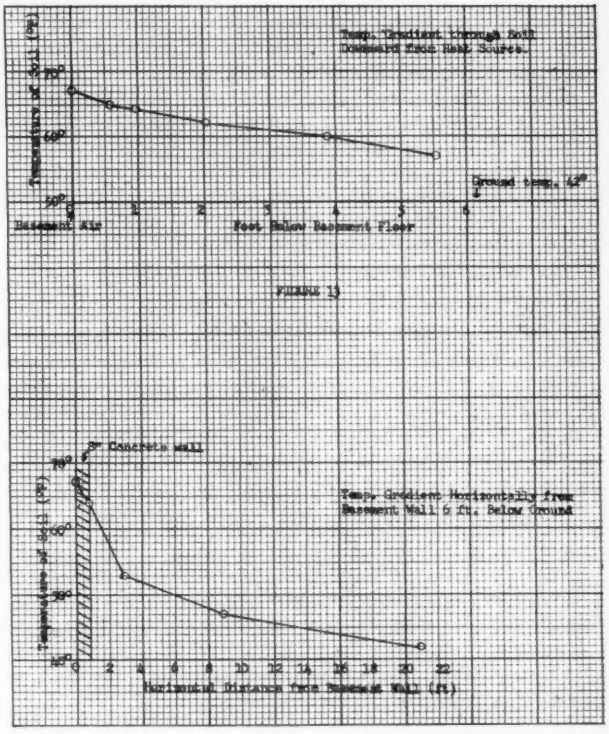

Temp. Gradient through Soil Downward from Heat Source.
Ground temp. 42°
Basement Air
Feet Below Basement Floor
FIGURE 13
8" Concrete wall
Temp. Gradient Horizontally from Basement Wall 6 Ft. Below Ground
Horizontal Distance from Basement Wall (ft)

Fig. 13 and Fig. 14

Of interest are the temperature plots shown in Figures 13 and 14 which show the effect of heat loss from a building on ground temperatures.[5] As was previously pointed out, this condition permits the recovery of a limited amount of higher temperature heat if it should prove economical.

VI. THERMAL CONDUCTIVITY OF GROUND

The information on transfer of heat through soils is very meager and no mention is made in the literature on the usage of the soil as a source of heat or as a place to dissipate heat. The most important factor insofar as heat transfer is concerned is the moisture content of the soil. Since there are no very pertinent discussions in the literature on the subject, the following comments are included to give the general background on this subject.

MacAdam points out that in four solids heat is transferred by conduction and by convection and radiation in the air spaces.[11] Smith states that in moist soil heat is transferred by conduction and vapor movement.[15] Some investigators have tried to relate thermal conductivity to physical properties in material. Figure 15, as given by Nelson, shows a general relation between density and conductivity.[12] Moisture appears to be the most important single factor in thermal conductivity of soils. Johnson states that the conductivity of wet soils is not related to the density.[6] For dry soils, the conductivity increases the density as was indicated in Figure 15. Svenson gives data on thermal conductivity of concrete roofs as being increased 200 per cent to 300 per cent by moisture.[16]

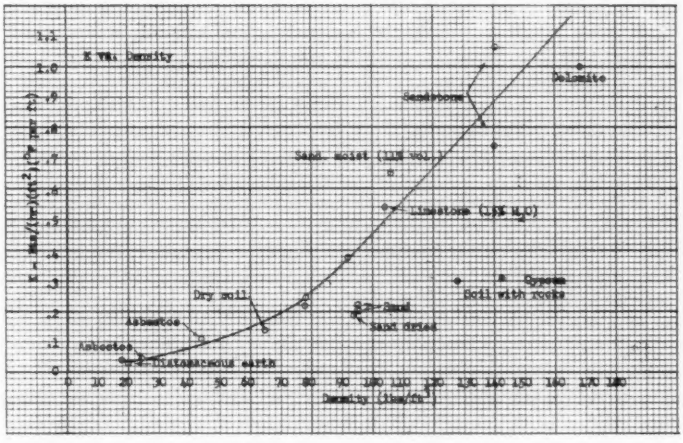


Fig. 15

Table I lists the values which were found in the literature for conductivity of soils and related materials. This table shows that considerable data are available but are not entirely consistent. Discrepancies of several hundred per cent are indicated. These are undoubtedly due to methods by which the data were obtained and possibly by failure to define the conditions.

Nelson, in discussing the application of thermal conductivity data on soils for use in oil pipeline design, indicates that the values will extend from .4 Btu/degrees F./sq. ft. Karge gives some data. He found that the time period required to reach equilibrium when transporting hot oil was quite considerable.[8] He states that the conditions and the character of the soil rather than the flow conditions in the pipeline control the heat loss. He recommends values of K of .5-.6 for well drained clay soils,

K equals 1 for partly submerged sandy soils, and K equals .7-.75 for mixed soils and for bare lines in California along the coast where heavy rains occur. Inland, K of .5-.6 would be more nearly correct where the annual rainfall of only 6 inches is encountered.

VII. WHAT NEEDS TO BE DONE

A review of the general information which is available indicates that studies on many points need to be carried out in order to permit the rational design of heat sources for heat pump installations.

Item No. 1 to be listed in any general program is an analytical study of the heat transfer to long pipes when buried in the ground. This study should be undertaken to determine analytically those factors which it is expected will have the most important effect on the transfer of heat from the ground to a liquid in a pipe and to estimate their relative effects. This is of particular importance in designing the later experimental programs in that it will emphasize those conditions which should receive first consideration and also permit preliminary estimates as to relative amounts of heats which can be transferred under varying conditions.

Item No. 2 in this program is a further laboratory study particularly concerned with the details of the heat transfer problem. It is proposed to undertake laboratory studies, utilizing the electrical analogue, of certain problems such as temperature distribution around buried pipes, the study of effect of closeness of tube spacing, the relative effects of distance below the ground, and the relative effects of ground surface temperatures at various distances below the ground on the general performance of such equipment. The utilizing of the electrical analogue should, as in the first case, give general information as to what can be expected under maximum and minimum conditions. This permits a more intelligent planning of the experimental program for the obtaining of the maximum amount of information. The utilization of laboratory study such as these is much more economical and gives more general information than the corresponding long-term experimental programs as listed under Item No. 4.

Item No. 3. Simultaneously with the above study, some laboratory experimental work would be carried out to determine the conduction characteristics of soils under various conditions. Under these conditions, an experimental set-up would be made whereby the conductivity of various types of soils under various moisture conditions could be studied in order to set up limits which might be utilized in the laboratory studies. Once these preliminary investigations are under way, it would be possible to properly design the experimental program as set up under Item No. 4.

It may be desirable to run a series of tests in various types of soils utilizing short lengths of pipe to determine spot values of the conductivity of the earth at various depths and under various soil and moisture conditions. Such tests would be made of only a few days duration and would not give all the information required. It would, however, permit an over-all study of a large number of soil types and conditions with a minimum amount of equipment and work.

Item No. 4 in this proposed program is a year-round experimental study of a piping system handling heat quantities comparable to those which would be handled under the maximum load conditions. In this program, it is proposed that an extensive experimental set-up would be installed requiring the disposition of an amount of heat equivalent to the conditions under which an actual heat pump installation would operate. Such a study would cover both buried pipes and a well in order to obtain data to be used in evaluating these two means of getting heat from the earth.

VIII. ACKNOWLEDGMENT

The table on thermal conductivities and the bibliography were compiled by Mr. E. W. Lang, of the Southern Research Institute. Mr. W. R. Waggoner, of the Commonwealth and Southern Corporation, of Birmingham, Alabama, has long emphasized the need of a study of heat sources in connection with heat pump installations. He has contributed much to this particular report through his suggestions and comments from time to time.

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Detroit Edison Produces "Your New Job" Handbook

DETROIT Edison now furnishes new employees with a 34-page illustrated booklet called "Your New Job," which is a frank and carefully-prepared handbook about the company. It endeavors, according to Sylvester F. Leahy, director of employee relations, to answer the questions that incoming men and women really want to know about the company.

The handbook covers a wide variety of items such as pay, unions, hours of work, lunch periods, absences and vacations, and also describes briefly the various company benefits, such as insurance and medical care.

One chapter deals with the company's management and gives an outline of the organization chart.

A foreword by James W. Parker, president, stresses the importance of satisfied employees and describes some of the company's efforts to make continuing work with The Detroit Edison Company pleasant.

The Forgotten Stockholder

By M. H. Frank
Vice President, Wisconsin Power and Light Company

Presented before the North Central Electric Association, Brainerd, Minn., June 23, 1946

QUITE early in life, and by vigorous treatment administered in locations where it was most likely to produce the desired effect, it was impressed upon my mind—to say nothing of my body—that there must be *discipline* in this world—that by the very nature of human existence there must be a boss or bosses in every activity.

My first experience was in the home, where my parents were the unquestioned bosses. I have learned since that in governmental affairs we have the political boss, elected or self-appointed, but who is nonetheless the boss. In social affairs, we have the society boss—usually a self-appointed dieting dowager, veneered with social graces but having basic characteristics, predatory tendencies, and a calloused hide that make her a cross between John L. Lewis, Ed. Crump, and "Forever Amber." Then we have the business bosses, the *owners* of the business. It is the real *owners* of your business and mine—the folks who theoretically and practically are our *bosses*—that I have been asked to discuss with you briefly.

In the subject assigned to me, the word "forgotten" is superfluous, for it is a matter of common knowledge that the great body of American stockholders is apparently forgotten. In this country, in many cases it is not considered good form for a stockholder to in any way identify himself as such except by his endorsement of dividend checks or signature affixed to proxies. In America, a stockholder who reads his Emily Post may feel that on his acquisition of a share or shares of stock in any corporation, he must automatically acquire the well-advertised "Dignity" of a stockholder, must deport himself with a quiet attitude that becomes his newly acquired position in society. Under no circumstances must he attend stockholder meetings, write letters of inquiry to the company management or in any way by word, gesture, or thought give expression to the idea that he owns any part of the business, or that the people on the payroll actually are *working for him*. In no way must he indicate that he has that knowledge of the basic rights of ownership. In this country, any stockholder who does not live up to these concepts of stockholder behavior may become a social outcast.

Role of an Active Stockholder

This is not true in other countries. In England, for example, the stockholder is a person. He or she (and just as often it is a she) attends stockholder meetings in *person*. They talk, they criticize, they ask questions, they vote, they want facts about income and outgo, which to them are as basic as the facts of life—how much money came in and why? How much money went out (and here their curiosity becomes an obsession)—where did the money go, for what was it spent? With whom was it spent? To them a balance sheet is something more than a display of two columns of figures which, for some mysterious reason, came out exactly even. They want to know about the things the Balance Sheet and Profit and Loss Statement *do not* show. The British stockholder has an inquiring mind and an assertive disposition. He considers the President, Vice-President, and Treasurer—particularly the Treasurer—as *his employees*, and no fooling. He is realistic about his place in the British corporate scheme of things. He is the boss, and he knows it.

In America, the vocal stockholder is a rare but not entirely extinct animal. In any corporation in which I may be interested, I like to see smooth-runing stockholders' and directors' meetings, for harmonious and uninterrupted constructive consideration of the company's progress and program. I confess to getting a considerable bang out of reading of the performances of the almost professional hell-raising minority stockholder who attends meetings of *other* companies, particularly those of our largest corporations. I do not refer to the racketeer or professional troublemaker.

It seems to me that American stockholders' meetings fall into two classes—the one such as I have just described, where nobody but officers and directors attend, suggesting a generally satisfactory corporate situation; and second, the one where practically a crowd of stockholders attend, indicating that a row is on.

In my opinion, this should not be, and as I will suggest in a moment, need not be. I think it would make for a more wholesome public attitude toward corporations, particularly the larger ones, if stockholders could be educated to attend *all* stockholders' meetings. When they do attend, the program should be so informative and profitable that they will want to come again and perhaps become even larger participants in the company's ownership and affairs. In my humble judgment, were this the regular, normal stockholders' meeting there would be fewer of the spasmodic, abnormal, mob meetings with a row as the attraction. I am getting ahead of my story, however.

What Is Public Ownership?

We hear much these days—in fact, we always have heard much—about so-called *"public ownership"* of basic industries. I think it is a mistake to argue against this by designating it as "socialism," "communism," or other "ism." In fact, I do not believe there is much to be gained in any leftist versus rightist controversy by mere name-calling or by attempting to classify movements or acts under this, that, or the other social or economic "ism" or gospel. It is not enough to condemn a thing as socialistic or communistic and call it a day. Too easily can the answer be, "So what? You can even call it atheism, if you wish. All I am interested in is 'Will it benefit or hurt me?' "

The answer to so-called "public ownership" advocacy is not name-calling. The answer is *"We already have public ownership."*

"Voluntary Public Ownership"—Ownership in all of our basic industries and most of the larger specialized ones as well is freely offered, invited, and urged on the general public. The stock of all of America's larger corporations

is offered for sale in the smallest denominations so that any citizen who *wants* to participate in public ownership of these industries may do so. You will notice I say "anyone who *wants*" to participate may do so. That distinction is important, as I shall suggest in a moment. Please keep it in mind. This ever-present opportunity for public stock ownership is one type and, in my opinion, the best and most democratic type of "public ownership."

The other type of "public ownership," and the one most actively promoted, contemplates the taking over of basic industries by government. This is but another way of saying the taking over of basic industries by *taxpayers*. In this type of public ownership—*"Involuntary Public Ownership"*—the citizens of the country are *forced* to participate in the ownership of basic industries. They have no choice in the matter.

I am not going into the advantages and disadvantages of *political management* versus *business management* of industry or into any of the controversial phases of the question as they are usually argued. I simply want to make clear this question of *ownership*.

I maintain that the only difference between the public ownership we have now and the public ownership proposed by our leftist friends is that the public ownership of the present is a voluntary one, while the public ownership proposed is a *compulsory* one. The proposal is to *force* citizens to invest whether or not they *want* to—to enforce the will of the majority upon the minority in a purely *personal* matter in which, we contend, there should be the maximum freedom of choice.

I would like to point out that, wholly contrary to the plea for democracy with which the disciples of compulsory public ownership like to clothe their promotions, they actually advocate the exact opposite. A basic tool of Fascism is force, compulsion, abolition of free choice. Compulsory public ownership is fascist in character, while voluntary public ownership, the kind we now have, is democratic in character. Again, however, the question of which "ism" applies to either is unimportant. The important thing is, From which will I as an individual derive the greatest benefit and the least harm? I believe any American citizen who thinks it through will prefer to do his own deciding as to where he wants to invest his time and money.

On this important question of Voluntary versus Compulsory public ownership, may I add that the *great* fact and the most difficult fact to make the public understand is that *nothing* the Government does or buys is free to the citizens—that when the Government takes over industry or does anything else of that nature, it is *investing* the *money*, the sweat, and the *bodies* of *every citizen* of the nation, the poor as well as the rich. Nothing the Government does is free. It all has to be paid for. When the Government *forces* us to *invest* in any project, it *means just that*. In the vernacular, it "sets us back" just that much. It is inescapable. It is unfortunate that there is such general lack of knowledge on that point. Understanding of it is vital to intelligent consideration of the choice between voluntary and compulsory "public ownership"—choice between investment in some business which Government says we *must* invest in, or investment perhaps in some business of our own, selected by our own free choice. Such choice may even dictate that we invest in the family savings account rather than in any business directly.

Our Boss, The Unforgotten Stockholder

If we understand that the ownership of the property and business to which we are devoted already rests in the public or rather in such portion of the public as have voluntarily invested, in other words, our stockholders—if we understand and adopt that kind of thinking, then it seems to me that most certainly we should give *at least* as much attention —and very preferably more—to our relations with these stockholders, as we give to that section of the public which has not elected to invest.

And that is what our company is endeavoring to do.

We consider our stockholders the owners of our property and recognize them as such. We make them the "Unforgotten Stockholders." It seems a perfectly natural, normal desire to know *our bosses*. What kind of folk are they? What do they do for a living? Did they invest in our stock as a speculation or for income? How much, if anything, do they know about the property and business in which they have invested? And how much do they know, first, about the *importance* of management, and second, about the *character* of the management of their property? How do they stand in community or business circles?

Upon making a survey of our stockholders, we found that they represented the following groups:

Housewives	28.0%
Skilled labor	11.6%
Executives	7.5%
Clerical and sales	7.9%
Retired	15.9%
Farmers	6.6%
Professional	9.5%
Miscellaneous	3.8%
Not specified	9.2%

Getting Out the Voting Stockholder

To keep posted on who owns our company and to whom we are responsible, and also to give that ownership an opportunity to contribute their advice and influence for the good of the Company and our customers, we have developed the following program:

1. As a result of the effects of the boom period in 1929 and the depression in 1933, we were faced with the situation of being able to pay only a portion of the regular dividends. There was considerable criticism from the stockholders; and as it was impossible to get all of our 16,000 stockholders living in Wisconsin into any one meeting, we decided to hold meetings in each one of our 16 operating districts. First, a representative of the Company contacted the principal stockholders in each district, asking questions, answering questions. He then made arrangements for a meeting of all the stockholders in that district. At the first or organization meeting, our president addressed each group, giving the history of the Company, relating all the major problems and the proposed solutions, and explaining how the stockholders could be helpful. He answered any and all questions that were asked.

As a result of each one of the 16 meetings, the stockholders decided to organize. In each district they elected a permanent committee to represent them in all Company matters in the future. The committees of 5 to 12 members then elected a chairman, vice-chairman, and secretary. These permanent committees were elected and organized in 1934 and 1935 and have been in continuous operation since then. Many replacements have been made, and in some cases additional members have been added to the committees. The committee membership is well-diversified, representing various religious faiths and the following occupational groups: Business—68; professional—11; housewives—10; farmers

—6; retired—29; community positions of interest—70.

2. We hold meetings with each committe, generally about twice a year. In some districts we have had 6 or 8 meetings in a year, to discuss special problems. At each meeting an officer of the Company presents a report of the Company's activities and results of all developments of importance that have occurred since that group's latest meeting. These presentations are usually illustrated, and are made as interesting and enlightening as possible. No essential fact in respect to the Company's operations is ever withheld. Bad news as well as good news is freely and frankly dispensed. These meetings are usually dinner meetings, and ample time is given to open discussion. Naturally, this feature brings the Company management and Company ownership into more intimate contact and wholesome mutual understanding.

3. As a result of each district committee meeting, the committee makes a written report over their signatures to every stockholder in their district. This covers all of the important features that were developed and discussed at the committee meeting.

4. Whenever we have a problem of community relations, it helps amazingly to have local citizens whom we can acquaint with the situation and who can serve in bringing about a solution that is for the best interests of all groups concerned.

5. Likewise, the Company management is responsible to these committees scattered over our territory (one-fourth of the state). They really amount to an organized group of customers, doubly interested in the Company. We can depend on our stockholders to act as observers and to advise us of things we are doing wrong, *before* any serious damage is done to our public relations and while there is still time to make the necessary corrections.

6. These committees have been very helpful in solving serious problems of service and in the protection of the Company's property and operations as affected by governmental bodies insofar as rates and competition are concerned.

Public Ownership by Active Stockholders

Let me repeat that if you accept the fact that you are operating under voluntary public ownership, the *least* you can do is to recognize the existence of your bosses—your stockholders—and in ways other than by sending them dividend checks, annual reports, and invitations to annual meetings or by urging them to send in their proxies.

I can speak from experience and with complete assurance in saying that if your recognition of stockholder existence takes the form of *organizing* them and *informing* them, you will find that instead of having an organization of, say, a few hundred people—your active employees who represent you with your customers and the public at large—instead of this you will actually have an organization of many thousands perhaps. And you will have all the friendships that go with the type of citizenship undoubtedly represented in your stockholder family—thrifty, solid, substantial men and women, the kind that comprise the backbone of our communities—the kind that support and promote anything and everything that makes for wholesome family and community progress.

If you are overlooking these people, you are overlooking one of your most valuable potential assets—one element in your business which you can convert into a militant force for greater service to your customers, increased business, increased profits, better public relations, greater satisfaction, greater security.

I hope to see the time when the electric service industry has *no* "forgotten" stockholders but hundreds of thousands of *"Voluntary Active Owners—Our Real Bosses."*

Sylvester B. Way

SYLVESTER B. WAY, chairman of the board of the Wisconsin Electric Power Company, was killed in an automobile accident near Suamico, Wis., on September 20th. Mr. Way, who was also chairman of several other utility companies at the time of his death, had planned to inspect the Brule hydro-electric plant of the Wisconsin Michigan Power Company, and was enroute for that purpose.

Mr. Way

With him in the car were Mrs. Way, James D. Shaw, director and general counsel of the company, and Mrs. Shaw, who escaped death, although all were severely injured.

Mr. Way had been active head of the Wisconsin Electric Power Company for 25 years, when he was elected Chairman in 1945. He was also board chairman of the Milwaukee Electric Railway & Transport Company, Wisconsin Gas & Electric Company and the Wisconsin Michigan Power Company.

Mr. Way first became associated with the electric power industry in 1898. In that year, after graduating from Drexel Institute, Philadelphia, he joined one of the early electric power companies in St. Louis, the Union Electric Light and Power Co., becoming their electrical superintendent. In 1911 he went to the Milwaukee Electric Railway and Light Co., to become assistant general manager. The following year he was elected a vice-president, and two years later, general manager. In 1925 he was appointed president.

Mr. Way was a member of the advisory committee of the EEI from 1944 until his death. Previously he served in a similar position with the NELA.

Many patented engineering devices are credited to Mr. Way. He designed various instruments employed in the construction and maintenance of electric distributing lines. His patented design for a radically different railway car truck has been used effectively in streamlined railway trains.

In Milwaukee, where he resided, the Milwaukee Advertising Club named him "Man of the Month" in a 1943 issue of its magazine "Torch."

Prime Objective: Good Public Relations And Load Growth

A Monongahela Power Company Urban Representative is the Voice of the Company to His Quota of Customers

A PLEASANT young man with a meter book, order book and a pair of pliers now is taking service and public relations into the home of the urban electric customers of the Monongahela Power Company, in West Virginia.

The young man is the company's urban representative. He and six others like him are putting a new idea into successful operation in one urban area of the company's territory. The reception the plan has been accorded in its five months of post-war effort indicates that it will be extended over the company's entire territory in months to come. However, it has been in operation on a limited basis for several years.

The plan is amazingly simple. One representative is given a fixed area to cover. As it is working now, each representative has approximately 900 customers to contact each month. And he will contact each of them, at least once a month.

He's the 'Front Man'

His call isn't a formal one. He stops around to read the meter (that's one of his fixed jobs), and he also makes it a point to pass the time of day with "Mrs. Smith." If she's interested in a new appliance, has a wiring problem or a complaint about her bill or service, he sees to it that the matter is given quick attention.

The representative is expected to be a real, honest-to-goodness representative of the company—one in whom the customer can feel the fullest confidence—whom the customer will accept as the voice of the company. To further that idea, the representative is the "front man" under any and all conditions. He may have to call in a company expert on lighting, wiring, kitchen-planning, electric heating or other services in which the company specializes, or he may coax his customer into the appliance store for a demonstration. But in all such instances he's on the scene with the service expert or the demonstrator, establishing the contact and seeing it through to a finish.

Selecting an urban representative is more than just picking a bright young man and turning him loose on 900 customers. First of all, the personnel department puts all new employes through a series of tests to ascertain mental and manual skills, initiative, ingenuity, education, and personality complex. It might be added that personality and ingenuity are particularly important qualifications.

Six-month Training Course

Once a man is selected for the work, he's put through an "indoctrination" course of approximately six months. During that period he is acquainted with the workings of every department within the company. His training in each department is based on how quickly or

(*Continued on page* 368)

MONONGAHELA POWER COMPANY
FAIRMONT, W. VA.

INTRODUCING
MONONGAHELA POWER COMPANY'S URBAN REPRESENTATIVE
RAYMOND McVICKER
SEE OR CALL HIM ON ANY QUESTIONS YOU HAVE REGARDING YOUR ELECTRIC SERVICE.
RESIDENCE: 699 LOCUST AVENUE
BUSINESS TELEPHONE: 2400—EXT. 339
RES. TELEPHONE 1171-J

Dear Customer:

We are extending our new plan to improve your electric service. Raymond McVicker will devote his entire time to your neighborhood and will perform all of the activities of your power company, including reading meters and making minor repairs on your electric appliances.

Mr. McVicker has received special training in repairing hand irons, toasters, percolators, lamp switches, all kinds of electrical cords and other small appliances. He also has been trained in determining the cause of lighting and fuse trouble and is available for such calls. If your large appliances, such as your refrigerator, washer, etc., needs service, he will gladly check it and advise you if the job requires a special serviceman.

We hope you will consider Mr. McVicker as your friend, as well as your Monongahela Power Company representative, in all matters pertaining to your electric service. He will see that any questions you may have, which he cannot answer, will reach the proper person for prompt answer.

For your convenience you may call Mr. McVicker at Monongahela Power Company, phone 2400, extension 339, or at his residence phone 1171-J. If he is not there you may leave a message and he will gladly call you. Please keep this letter for reference.

We sincerely hope you will like and use this new service. Any suggestions you may have for it's improvement will be appreciated by Mr. McVicker.

Yours very truly,

B. T. Henry
Division Manager

A Letter Introduces the Urban Representative to Customers in His Area

"Interdependence — Then and Now"

By Gwilym A. Price
President, Westinghouse Electric Corporation

An address before the Eleventh Annual Conference of the International Association of Electrical Leagues, New York, Oct. 2, 1946

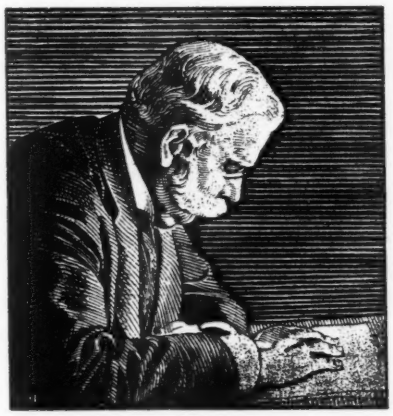
MOST of the troubles in the world today are the effects of interdependence. But paradoxically, our hopes for a better world, for a better and happier nation, and for the better life which is the goal of everyone, rest on the interdependence of nations and of individual men.

Interdependence is both cause and effect of civilization. Civilized man is interdependent man. Each advance of civilization has accentuated interdependence, has further complicated the relationship of the individual to his environment, to other individuals and to society as a whole.

Each of us knows the facts of interdependence — facts both favorable and unfavorable. Each of us knows that a crop failure in the Argentine makes children go hungry in Holland, that a shortage of steel scrap delays delivery of the post-war automobile or refrigerator, just as we know that only the best of human and industrial teamwork could produce our country's great wartime machine or can enable us to return to peacetime prosperity and contentment.

We know these facts; perhaps it is true that nearly all men know them. But do we recognize them clearly as facts which must govern all that we say and do? When men and nations fail to recognize them and to act accordingly, we have war, domestic conflict, confusion and disaster. When there is general understanding of these facts of modern living, and action in harmony with that understanding, we shall have fair dealing and good will among men.

In honoring George Westinghouse, the Electrical and Gas Association of New York is paying tribute to a man who did far more than his share to make life easier, more comfortable and more productive for his fellows. Westinghouse Thomas Edison and the other giants of that day advanced civilization—at least in its material phases — more rapidly than ever before in history. And in doing so, since civilization and interdependence are synonymous, they vastly increased and accelerated the interdependence of men and of nations.



George Westinghouse

October 6 will mark the 100th anniversary of the birth of George Westinghouse. Few men have led a life more completely open to the public view. Few have been more thoroughly discussed and appraised, in print and otherwise. So it is not necessary for me to do more than remind you, who know so much about him and his work of the principal elements of his character or of his major contributions to the world's progress.

Westinghouse was more than an industrialist who founded sixty different companies all over the world. He was more than an inventor who received 361 patents over a period of less than half a century. He was a creative leader and visionary in one of the most creative historical periods of industrial growth.

Early in his career, when railroads were becoming the lifeline of the nation, he invented the air brake, one of the greatest contributions to safety in transportation. Later he pioneered in the development of railway signals and interlocking switches; he invented a safe and efficient mechanism for joining railway cars; he brought out the first mainline electric locomotive and was a pacemaker in modern railway electrification.

When the nation's industries needed power, he developed a system for transmitting and using natural gas, and topped this with perhaps his greatest contribution of all—today's alternating-current system of generating, transmitting and utilizing electricity for power and light.

To modern world commerce he gave a perfected steam turbine, geared to drive ships, and with this paved the way for the development of powerful present-day fleets.

Today, one hundred years after his birth, scarcely a man lives in America or in many other parts of the world whose life and activity have not been affected by what George Westinghouse did.

Out of the many thousands of words which have been used to describe George Westinghouse and define his talents, I find none more appropriate for this occasion than a few sentences by one of our great present-day scientists, Dr. A. V. Hill, of the Royal Society of England:

"George Westinghouse was a pioneer in the application of scientific discovery and technical achievement to human comfort and security. He was possessed not only of superlative ingenuity and skill in engineering and invention, but of remarkable vision and courage in their application. Perhaps equally important in the development of his great enterprises was his consideration and respect for human labor and those who worked with him. He was in fact an outstanding example of leadership in the movement of the last hundred years that has given us today such vast opportunities for the betterment and broadening of human life."

But perhaps there could be no more complete evidence of the greatness of the man, than that this group should meet here today, more than thirty-two years

after his death, to honor his memory.

But it is one thing to meet and honor a great man's memory; it is another, and more productive thing, to study and apply the lessons of his career to our own problems.

Even one hundred years ago, interdependence was a reality. Today, due so largely to George Westinghouse and his able contemporaries, interdependence is the supreme reality of existence—to every race and nation, to every group and every individual.

We need not wonder what Westinghouse would do if he were here, faced with today's conditions. The record of his life is one of leadership, which means that he set the highest premium on mutual understanding and on the teamwork that grows out of such understanding. And he was a man who had the power to read in the circumstances about him the fundamental needs for the future. He had the imaginative genius to view these needs as his challenge, and he had the determination to follow a course of action which he knew would bring widespread benefits.

He would need no argument to convince him that this is indeed one world; that each of us is affected, for better or worse, by the thoughts and actions of others. He would agree, I am sure, that the greatest need of this interdependent world is improvement in the relationships of those human beings whom he did so much to bring closer together and more dependent on one another.

He would find this a world in which a leading scientist recently has posed the question:

"Can it be that the speed and intensity of scientific discovery, and its technical application without sufficient ethical restraint, have now reached the limit beyond which man will be unable to absorb and control them?"

He would find a world where laymen as well as scientists wonder whether production of the instruments of progress has outrun man's capacity to use those instruments wisely. He would find a world where human nature has changed less than any other factor; where human nature is just as much a bar to progress as in his own day.

But George Westinghouse was a man who thrived on adversity, who seemed to welcome opposition only in order that he might overcome it. He never ran away from his problem; he tried always to measure those problems accurately and then meet them head-on with a solution. So I am sure that were he alive today, his major concern would be less with machinery and more with men. He would be doing his best to make this one world a workable and a livable world. And so must we.

Because Westinghouse was eminently practical and sensible, he would begin at the beginning. He would not try to remake all the world all at once. He would attack the problems at the point of his own responsibility—in his own business, in his own relationships with his associates and his employees and the unions which represent them.

Fortunately for us, none of us has the responsibility for getting along with Russia, for straightening out China, for keeping the peace in Europe or Asia. Each of us has the job of living peacefully and productively with his immediate neighbors, the job of winning the good will and the friendly cooperation of associates and employes, the job of making interdependence a success in his own individual circles. Surely we can learn how to do that; surely we can deal effectively with men and women of our own kind, who speak the same language, have the same birthright and the same basic traditions, share a common economic interest with us. If we cannot, how can we blame Mr. Molotov for not getting along with Mr. Bevin or Mr. Byrnes for not winning Mr. Molotov to his way of thinking?

Business management has no greater task today than to make clear the facts of interdependence and of mutual interest and mutual progress. Understanding and unity, like charity, begin at home. We cannot have national unity without unity on a local level. And the place to begin to achieve that unity is in the individual business, in the development of confidence and trust and teamwork between manager and employe.

Perhaps none of you know better than I do the difficulties in the way. But all of you share with me, I hope, the belief that through intelligent and diligent effort we can surmount those difficulties. For we must surmount them. The penalties of failure, the rewards of success, are too great for us not to do so.

I believe that management must spend even more time and energy in developing the full potential of our individual employes than we have devoted in the past to utilizing technical knowledge and machinery. That human potential can be best developed through improved appreciation of mutual interest. Its development requires the elimination of misinformation and misunderstanding, the eradication of conflict and cross-purpose.

The modern industrial structure has robbed many an employe of much of his sense of individual importance. So far as we can, we must restore it. We must keep our people informed of our plans, our policies, our hopes for the future, and of their place in them. We must make them realize their responsibilities, for the most productive man is the one who feels a sense of responsibility for others as well as for himself. We must give them recognition and a realization of opportunity. Above all, we must give them a feeling of unity with management and ownership. They need to know, more than ever, that united we stand, divided we fall.

We must, and we can, eliminate the belief that there is essential conflict between employer and employe. There can be no conflict of interest between two members of the same team.

George Westinghouse's main concern, throughout his exceptionally creative lifetime, was with power. His career was a succession of triumphs in the mastery of power and its application for useful purposes. Were he among us today, he would find his greatest opportunities, like ours, in the field of power—in the generation, transmission and useful application of that greatest of worldly powers—the power of the human mind and the human spirit.

Reaffirmation of Inch-Millimeter Conversion for Industrial Use, ASA B48.1-1933

THE Mechanical Standards Committee of the American Standards Association decided at its meeting of July 17 that the American Standard, Inch-Millimeter Conversion for Industrial Use, B48.1-1933, should be reaffirmed by the American Standards Association as of January 1, 1947, unless adverse comments to such reaffirmation are received from any responsible group before that date. In this case, such comments will be given due consideration before a decision on reaffirmation is taken.

This procedure is in accordance with the ASA Bylaws which require that

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Government's Place in the Industrial Outlook of Canada

By The Honorable E. C. Manning

Premier of Alberta

Excerpts from an address before the Canadian Electrical Convention, Banff, Canada, June 27, 1946

IT IS our view as a Government, and I am sure some of you will agree, that insofar as industry is concerned there should be a minimum of government interference and a minimum of regulation. I think if there ever was any doubt in anyone's mind of the ability of Canadian industry to do a good job, that doubt certainly was dispelled during the years of the war. This country, young as it is, has attained a reputation throughout the world based upon the splendid way in which Canadian industry accepted the challenge of the war years. It has been an object lesson to the rest of the world of what industry can do and how far it can go when given the green light, if its hands are not tied by a lot of regulations and restrictions.

In the light of these circumstances, you can appraise for yourselves what might be termed the industrial outlook for this part of Canada. However, I would like to suggest to you what I believe to be the five basic factors involved.

Five Industrial Factors

It seems to me that the first factor in the future development of industry is the extent and diversification of our natural resources. I do not think I need to labor that point any further. Most of you are agreed that in this connection this area of Canada rates a high score. In fact, I think it safe to say that from an industrial standpoint this part of Canada is one of the few large remaining undeveloped areas which has great potentialities because of the extent and diversification of its natural resources.

Industrialists who are interested in its development and its bearing on the economy of our country should use sound and careful judgment in the type of industry which they seek to establish. We could very easily set back industrial development a long way by attempting to establish in this part of Canada industries for which the area is not suited and which, therefore, would be headed into almost certain failure.

If governments are to destroy the initiative of individuals which finds expression in private enterprise, then we are not only heading ourselves into incalculable difficulties in the future, but we are robbing society itself of a driving power, a motivating force that is absolutely essential to a strong and virile democratic nation.

My second factor is the availability of a plentiful supply of fuel and power. You cannot have industry unless you have fuel and power. Here again this Province should commend itself to any enterprising industrialist, for Alberta has a super-abundance of natural gas and coal, two important factors as far as power and fuel are concerned and also, as I have mentioned, the potential water power that is practically untapped as yet gives great scope for further expansion in the future.

Getting to the Market

The third factor in which every industrialist is interested when appraising whether an area is suited for a specific industry is the question of transportation. Here we have a very difficult problem. Transportation has always been one of our greatest difficulties. We are located a good many miles from seaboard, which means that industry here is not in a favored position to compete for markets that require goods to be shipped to the seaboard for further transportation from our coastal ports. We are also, unfortunately for us, at the apex of Canada's freight rate structure and rail transportation, therefore, does present a very serious problem which industrialists have to weigh carefully.

The development of air transportation has been an important factor in the northern region of our Province and beyond in the Northwest Territories. I doubt if that vast area would have been opened up for another hundred years if it had not been for the expansion of the aviation industry, which has made the area accessible to prospectors and to those who are interested in discovering the extent of mineral deposits. The results have been very good indeed and industry should remember that it owes a great deal to aviation for the contribution it has made.

Markets Must Meet Global Needs

The fourth factor of which I would like to speak is the question of markets. Every industrialist is interested in knowing whether there is a reasonable prospect of having a stable market for whatever product he is able to produce.

It seems to me one sound approach is to recognize that we have an agricultural population and that the Canadian West does provide a large local market for certain types of products. Industry would be wise to concentrate on those lines of production for which local markets exist.

It is a matter of history that industrial development and influx of population go hand in hand. It is more feasible sometimes to bring people to the resources than it is to process and take the products of the resources to people in areas far removed.

In this connection we should bear in mind the present world picture as a whole. The world today needs more goods. We must not lose sight of the fact that this new world has become a very small place as compared to what it used to be, because of modern methods of transportation. In this new small world the availability of goods to supply human needs, whether here or in the other countries of the earth, has a bearing on the ultimate peace and security

of the world as a whole. We should have learned from bitter experience that the economic chaos, hunger and privation are the circumstances that give birth to all the isms that arise to plague the good and welfare of mankind, that give birth to the Hitlers of Germany, as they did after the last war, which consummated in the war just ended with its fearful toll of life and limb.

The last factor to which I shall refer is what I call the human element and this is perhaps the most unpredictable of all. I would suggest two or three points under the heading of man-made or human factors, to which we might at this time give a little attention.

The first one is the question of labor-management relations as they exist not only in Canada but throughout the world. Every citizen today should realize that the unsatisfactory labor relations are sabotaging postwar reconstruction and seriously retarding production at a time when production is one of the greatest needs of the human race.

It is all very well for us to talk about these things but it is difficult to know what to apply as a practical solution. I would suggest to you that the situation calls for a broader outlook on both sides. It seems to me that management must realize that it must of necessity concern itself with more than the mere production of goods and the making of profits.

Management today, and business generally today, has a greater responsibility to society as a whole than ever before and the time has come when industry can no longer isolate itself from the problems of society generally and say: "Those are things that the government or other people will look after. I am going to stick to the job of producing goods." The isolationist in industry today is just as out of place as the isolationist in the political world, for everything has become so interlocked that if industry does not take a direct interest in the other phases of our public life, then in the end it is only bringing trouble and difficulty upon itself.

On the part of labor I think there is a great need for broader thinking, for a broadening of viewpoint, for getting higher horizons. Labor must learn that it is not a matter merely of getting the most pay for the least work and ignoring the welfare of others to attain selfish ends. That is something that has to be recognized. We are facing today in this country a serious threat of inflation. The United States is perhaps facing a more serious threat. This danger could be offset by increased production and this would be the most practical way of doing it. Yet at this very time when it is necessary to offset that danger, instead of all of us jointly putting our shoulders to the wheel, you have labor and management fighting back and forth, with governments in the fight as well, each trying to get something more for its own particular group, and in doing so retarding that very production which would be the greatest possible factor in removing the danger of inflation and assuring an abundance for all.

Government Policy and Industry

Before leaving this point of labor-management relations I would like again to say that as far as governments are concerned, my own point of view is that governments should not interfere unnecessarily in labor-management relations. I think governments' position should be restricted to that of referee. Certain legislation to provide the necessary mechanics is undoubtedly the duty of government, but from there on I do not like to see governments becoming arbitration boards between management and labor. I repeat, I think the governments' position should be reserved to that of a referee and that every encouragement should be given to have labor problems settled between management and labor alone and without any interference from governments or outside interests.

The second point under this heading of human factors is the matter of government policy and its bearing upon industrial development. I think there are two headings that come under this point that are worthy of note. Today there is a greater controversy than ever before between the philosophies of private enterprise and state control. It is an issue in which the welfare of industry is very vitally involved, in fact, is at stake.

I have no hesitation in saying that it is my earnest conviction and the view of the government of this province that private enterprise is absolutely essential to a strong and virile democratic nation. If governments are to destroy the initiative of individuals which finds expression in private enterprise, then we are not only heading ourselves into incalculable difficulties in the future, but we are robbing society itself of a driving power, a motivating force that is absolutely essential to a strong and virile democratic nation.

By that I do not mean that the abuses and iniquities often manifested in private enterprise have not to be dealt with. I am convinced that only by the removal of those unfair features of private enterprise can we preserve in this modern world the respect of the public as a whole for private enterprise in a properly functioning democratic society.

In discussing the subject of government policy one cannot overlook the matter of government fiscal policy and its bearing on industry generally. It is a matter which has got to be adjusted in the next few years if we are going to avert some unfortunate effects upon Canadian industry as a whole.

In the matter of taxation, industry has a right to know what to expect in the field of government fiscal policy. I have no hesitation in saying that to me one of the greatest disappointments in the almost complete collapse of the recent Dominion-Provincial Conference was the fact that it has placed Canadian business in a position where it does not know what the tax situation is going to be in the next few years. I contended at the Conference that if given a known set of facts, Canadian business would adjust itself to those conditions, as long as it knew definitely what the situation was, but to leave industry and business in a position of uncertainty in a period of postwar reconstruction is putting a barrier in the way of industrial progress that is certainly going to make the future of industry much more difficult.

I think we have to recognize that industrial risks must be offset by an opportunity to obtain corresponding compensation. If you are going to preserve private enterprise you cannot expect individual citizens to invest their savings and take the great risks often involved in pioneering industrial development unless there is a corresponding compensation if they are successful in the venture which they undertake.

It is my considered view that if the policy of over-burdening industry with taxation continues, the ultimate result will be to bring in state ownership through the back door by forcing private individuals out of business. When we reach a stage where there is not enough private enterprise to provide the needs of the citizens, then the next step is state ownership. The state will step in and take over. I am just as opposed to state socialism coming in the back door as I am to having it come in the front door where it may be recognized for what it is.

Plans for Edison Centennial Celebration Gather Momentum

By Clarence L. Law

Chairman, Edison Centennial Committee of the Edison Electric Institute

THIS is a progress report of the Centennial birthday anniversary of Thomas A. Edison, scheduled for February 11, 1947. The program of observance being arranged by the Thomas A. Edison Centennial Committee and all of the cooperating groups is wide in its scope and of real significance.

As chairman of the Edison Centennial Committee of the Edison Electric Institute, I have canvassed the national committee's working staff in order to present the overall aspect of the Centennial program. Included here also are suggestions for tie-in participation by local public utility companies. In this connection, the Centennial committee of EEI is preparing information and data which will be extremely useful to local utility companies in helping them properly to observe the centennial of Thomas A. Edison's birthday.

Of particular significance is the interest being shown in the Edison Centennial by the editors of magazines with large national circulations. For instance, the February issue of *Coronet* magazine will contain an eight-page section with reproductions, in color, of twelve paintings depicting high spots in the life of Thomas A. Edison. The text is being prepared by C. F. Kettering, chairman of the national committee, and there will be an introduction written by Mrs. Thomas A. Edison.

Several other national periodicals are planning to use material on Thomas A. Edison in their February issues. There will be covers, articles, pictures and editorials.

The interest shown by editors is certainly not confined to the national magazines. Many of the important trade magazines and business papers, as well as individual company publications, are making plans to observe the Centennial. Many publications of this type have requested material and photographs of the national committee and many others have indicated that they are working up their own material.

The radio certainly will not neglect proper observance of the occasion. Four sponsors of important musical programs

over national networks will dedicate their programs during the week of February 9 to 16 to Mr. Edison, in honor of his contributions to music through his inventions of the phonograph and motion pictures and his basic work in electronics. This part of the overall program is known as American Music Week in Honor of Thomas A. Edison, and cooperating sponsors have been asked to feature the music of American composers.

Another outstanding weekly radio program, which dramatizes the lives of famous Americans, has naturally selected the story of Thomas A. Edison for its thirty-minute broadcast on February 9.

The motion picture industry plans to provide news-reel coverage of events in connection with the Centennial observance, with background shots and references to the inventor's work and life.

One of the most important phases of the national committee's work has been the preparation of a series of educational posters which will be distributed to the nation's 30,000 public, private and parochial secondary schools. Originally it was planned that these posters would be placed in the mail in late October, but at the suggestion of the U. S. Office of Education, distribution will now be made on January 1 to avoid the possibility of conflict with the special pre-Christmas programs customarily arranged in schools.

These posters, eight in number, are 24 inches wide by 32 inches long. Each poster develops pictorially, with a minimum of text, an important phase of Mr. Edison's life or one of his major contributions to progress. Titles of the posters are: Edison and the Electric Light; Edison and Electric Power; Edison and the Motion Picture; What Is Invention; Who Was Tom Edison; Man and Communications; Music for Everyone; and Edison's Times.

"School Life," a publication prepared by the U. S. Office of Education, will feature an article in its January issue urging teachers to take notice of the Centennial by emphasizing the inspirational and educational values to be found in a study of Edison's life.

Additional sets of the posters will be distributed to museums and libraries. Members can secure sets in reasonable quantities upon written request to the Thomas A. Edison Centennial Committee, 40 West 40th Street, New York 18, N. Y.

The national committee has received many indications of local observances of the Thomas A. Edison Centennial throughout the nation. For instance, the numerous local electrical leagues have taken the leadership in sponsoring observances in their localities. These will include Edison Day dinners, museum and library exhibits, local radio programs, window displays by mercantile establishments of all kinds, institutional advertising, etc. There will also be tie-ins by means of postage meter slugs, medals and medallions, framed portraits, etc.

The American Institute of Electrical Engineers is urging its seventy-five sections throughout the country either to take the lead in sponsoring local observances or to cooperate with such other local groups as may be planning Edison Centennial activities. In New York City, for example, the AIEE will sponsor, with the cooperation of other outstanding professional societies, a February 11 dinner at the Waldorf-Astoria Hotel.

Local observance of the Centennial will also be made by such important organizations as Rotary Club, Kiwanis,

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Charles A. Coffin Award Is Reinstated After War-time Suspension

AFTER a wartime suspension, the Charles A. Coffin Award, best known, most highly coveted distinction open to all operating companies in the electric light and power industry has been reinstated. Its reinstatement also marks its silver anniversary.

Twenty-five years ago, in the aftermath of another war, the Award was established by the Charles A. Coffin Foundation to suitably recognize and honor nationally an electric company which during the year preceding its award had achieved the greatest advancement in its operations and physical plant, thereby making a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry.

Since its establishment eighteen companies have received the award. No awards were made for the years 1931-1932, nor during the war years 1942-1943-1945. As a tribute to the magnificent contribution of the electric industry to the war effort the award for 1944 was collectively bestowed on the whole industry.

Tangible Proof of a Job Well Done

The award, a gold medal, with a supplementary cash award for the employees' benefit fund of the winning company, is tangible proof of a job well done, and has brought to each of its winners merited recognition from the industry, and commendation from the public.

It is not by technical advance alone that history is measured in the electric power industry. Progressive changes in the approach to consumer relations, accounting and rate-making methods, employee relations, business promotion and advertising, and other operating functions have all been footholds in the climb of the industry toward better service for the public, and it is all these things, in whole or in part, that the award commemorates each year it is made.

Brief and Simple Entries

Prerequisite for consideration for the Award, which is made on a competitive basis, is the submission to the Charles A. Coffin Award Committee of a brief and

simple presentation of the significant accomplishments which in the view of the company entitles it to consideration for the Award.

Briefness and simplicity is urged by the Committee, not only for the sake of relative ease in weighing and adjudging the accomplishments, but also to reduce to a minimum the time and effort of competing companies in the preparation of their entries.

Basis for Presentation

A statement of one or more outstanding accomplishments should be made the basis of a company's presentation. Information submitted should relate particularly to the accomplishments which have reached fruition in the year 1946, but information relating to decisions and operations of earlier years may be included when they played an important part in bringing about the outstanding accomplishments cited.

A clear setting forth of the more significant facts and considerations is all that is necessary. Elaborate and costly exhibits are not desired.

The following subjects and any other appropriate items may be presented as contributory evidence in support of the principal accomplishments upon which the exhibit is based.

General Administrative Features

Financial operations as reflected by the company's balance sheet and income statement.

Production and sales of electric energy.

Rate developments.

Important changes in company administration for increased efficiency.

Employee relations.

Employee training program.

Relations with consumers and the public.

Commercial and Accounting Features

Increased usage of electric energy and revenue.

Promotional and sales programs, including: Cooperative sales development: financial plans.

Advertising programs.

Trade relations.

Farm electrification progress.

Industrial development program.

Accounting developments.

Engineering and Operating Features

System operation.

Pioneering developments.

Reliability of service.

Generation, transmission, distribution, construction designs, practices and developments.

Accident prevention.

The Honor Roll

Companies which have won the Award in the past years are:

1922—Southern California Edison Company.

1923—Public Service Company of Northern Illinois.

1924—Consumers Power Company.

1925—Commonwealth Edison Company.

1926—Edison Electric Illuminating Company of Boston.

1927—Puget Sound Power and Light Company.

1928—El Paso Electric Company.

1929—Public Service Electric and Gas Company.

1930—Virginia Electric and Power Company.

1933—The Hartford Electric Light Company.

1934—The Tennessee Electric Power Company.

1935—Idaho Power Company.

1936—Consolidated Edison Company of New York, Inc.

1937—The Cincinnati Gas and Electric Company.

1938 — Wisconsin Electric Power Company.

1939—The Washington Water Power Company.

1940—Wisconsin Public Service Corporation.

1941—San Diego Gas and Electric Company.

*

1944—Electric Light and Power Industry.

1946 a Year of Record Highs

Nineteen forty-six will be long remembered in the electric utility industry as the year in which phenomenal increases in the number of customers connected amazed utility executives, and agreeably distorted all normal patterns of customer growth—the year in which output of electricity, despite the end of war production and the crippling effect of strikes in major industries, reached record highs, and in which the average residential customer's use of electricity, despite severe shortages of appliances, was higher than ever.

In this year of the silver anniversary of the award there are obviously many companies, large and small, throughout the country who are doing outstanding jobs of service to the public and to industry who should compete for the award. It is the hope of the Award Committee that all companies who feel that their accomplishments merit consideration for the award will enter the competition.

All entries must be filed with the Committee not later than April 1, 1947. They should be addressed to the Charles A. Coffin Award Committee, Edison Electric Institute, 420 Lexington Avenue, New York 17, New York. The award will be made at the Annual Meeting of the Edison Electric Institute, to be held at Atlantic City, June 2-5, 1947.

The Committee is composed of Grover C. Neff, President of the Edison Electric Institute; Karl Taylor Compton, President of Massachusetts Institute of Technology; Charles W. Kellogg, Past President of the Edison Electric Institute.

* No Awards were made for 1931, 1932, 1942, 1943 and 1945.

Edison Electric Institute Defines Policy on Farm Electrification

Calls for Rapid Extension of Lines and Cooperation with All Agencies Interested in Farm Betterment

A STATEMENT of policy defining the attitude of the electric power industry towards farm electrification was approved by the Board of Directors of the Edison Electric Institute at its meeting last month. The statement sets forth the practices, which will most effectively promote extension of electric lines to farms now unserved, and calls for cooperation of all agencies interested in increasing the value of electric service to the farmer.

"There is a task in farm electrification not yet completed," the statement emphasized, and, "because of its importance to farmers directly concerned, and to the national welfare, the Edison Electric Institute desires to make clear its attitude in this connection. Its interest in the matter is indicated by the fact that electric operating companies serve at retail about 60 per cent of the connected farms, and through wholesale contracts supply a large part of the power used by the other 40 per cent."

The statement affirms that "it is the policy of the Edison Electric Institute, working through its members:

1. To promote the extension of electric lines as rapidly as possible, in an efficient manner, to help make electric service available to the remaining one-fourth of the farms of this country that are still beyond existing lines, and to increase the number of users of service along existing lines.

2. To foster cooperation between managers of operating companies and officials of rural cooperatives on all matters of mutual interest, to reach better understandings on all questions that naturally arise when two separate distribution systems operate in adjacent territory.

3. To foster the idea that extensions of lines to be built should be constructed in each instance by that operating company, REA cooperative, or other agency that is in the best position to build the extension most economically.

4. To advocate that operating companies provide facilities so that cooperatives can buy power in adequate amounts at fair prices, thereby making unnecessary and undefensible the use of federal money by REA cooperatives or other government agencies for generation or transmission equipment that would largely duplicate existing installation.

5. To foster research and development in rural power lines to improve the quality and reliability of rural electric service.

6. To promote within its membership, through the investigations and studies of its farm committees, new developments and ideas to increase the usefulness of electricity to the farmer.

7. To join with other national groups interested in farm electrification in the support of research work, preferably through agricultural colleges and experiment stations in the development and adaptation of improved equipment for farm operations; to cooperate with and stimulate manufacturers in developing and manufacturing such equipment; and to participate in the dissemination to farmers, through agencies such as the Agricultural Extension Service, of factual information concerning such new developments.

In releasing the statement of policy, Grover C. Neff, President of the Institute, said that about 4,100,000 farms, or three-quarters of all those occupied, are now either connected to power lines, or within one-quarter of a mile from such lines. Five-eighths of all farmers are taking electric service. Electric companies expect to connect about 600,000 additional farms in the three years, 1946 to 1948. Cooperatives are expected to connect another 600,000, and other agencies about 40,000 farms during this period.

With the completion of the task of building rural extensions thus in sight by 1948, a major objective of the electric companies is to get electric power efficiently applied to as many farm jobs as possible, and thus increase its value to the farmer. The companies are already working with state universities and farm organizations on numerous research projects, and with other groups in the electrical industry to find increasingly efficient ways of applying power to farm operations.

Degree of Farm Electrification Depends Largely on Farmer's Prosperity

"THE influence of urban-areas on the degree of farm electrification is clearly shown on the accompanying map," states the *Electrical Times* (London) in its issue of August 22, in presenting a comprehensive survey of the results of electrifying farms in Great Britain.

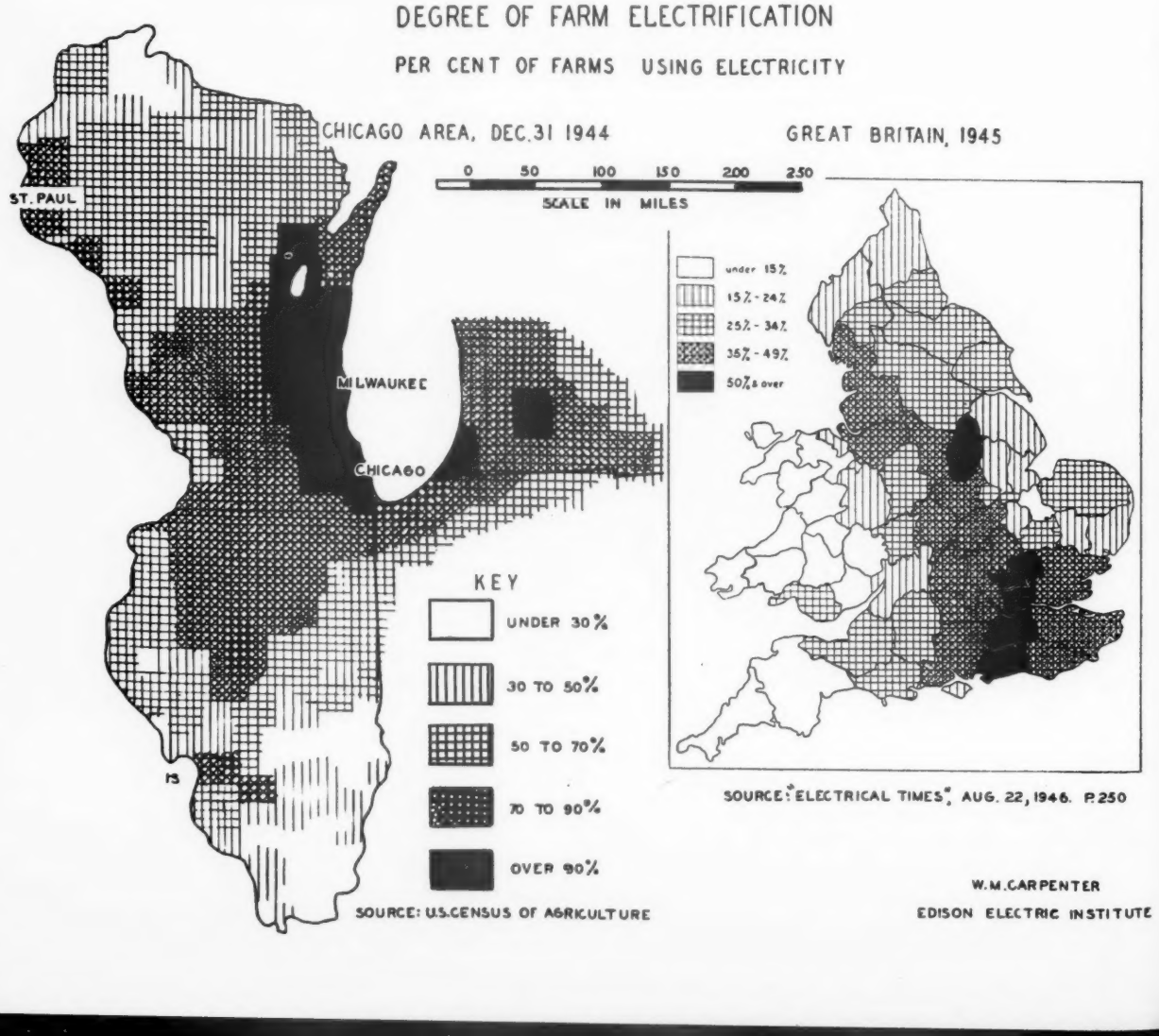
An interesting comparison is afforded by a similar map of farm electrification in the Chicago area, as indicated by data just released by the 1945 Census of Agriculture. This emphasizes the often overlooked fact that the degree of farm electrification is largely determined by the purchasing power of the farmer, which, in turn depends upon the character of his soil and his accessibility to markets.

The fertile agricultural environs of Chicago and Milwaukee have a high degree of farm electrification. Conversely, the lake-and-forest region of Northern Wisconsin and the coal mining areas of Southern Illinois show a low figure—in spite of their proximity to St. Paul and St. Louis respectively.

The close relationship between farm electrification and the farmer's financial status is shown by the following table, derived from the same 1945 Census, which gives the percentage of farms using electricity and the value of land and buildings on the average farm of the various counties in Wisconsin on December 31, 1944:

Degree of Electrification	*Average Value of Farm (Land and Buildings)*
Over 90% of farms electrified	$11,768
80% to 90%	11,264
70% to 80%	8,696
60% to 70%	5,922
50% to 60%	5,391
40% to 50%	4,132
30% to 40%	3,943
Under 30% electrified	2,463

The accompanying map shows England and Wales, as published by the *Electrical Times,* together with Wisconsin, Illinois and adjacent parts of Indiana and Michigan all drawn to the same scale. Note, however, that the degree of farm electrification shown by the various scales of shading is about *twice as great* in the United States as in Great Britain.



Residential-Farm Customers Lead in Postwar Power Increase

A TOTAL of 1,070,000 residential and farm customers were added by the electric power industry in the United States during the first eight months of 1946, despite the housing shortage and difficulties encountered in securing poles, wire and electrical equipment.

Data received from power systems throughout the country show that for the twelve-month period after V-J Day 1,668,000 new customers of all classes were added to power lines: of this number 1,364,000 were residential and farm customers.

The twelve-month increase represents almost exactly the total number of customers connected to the lines of the power companies during the first 25 years of the industry's growth, according to H. S. Bennion, managing director of E.E.I. Rapid acceleration of farm electrification, re-occupancy of vacant homesteads, reconversion of other structures into living quarters, new construction, and new businesses started by returned servicemen were major factors in the unprecedented gain in new customers.

The greatest rate of gain has occurred since the first of the year and if the present rate of 135,000 homes and farms connected per month continues throughout the year, the 1,600,000 new customers which will be added in 1946 will represent an all-time record.

The majority of the new customers have been added to the power lines in rural areas. In such localities new housing can be built more rapidly than in incorporated communities, where building codes afford less freedom to prospective builders.

About 70 per cent of all residential users of electricity—roughly 20,000,000 customers—are located in cities and towns of more than 2500 population. Reports of the larger urban electric companies reveal an increase in residential customers of less than 1 per cent during the first half of 1946, indicating that less than one-quarter of the new electric customers have originated in urban centers.

In rural areas which include communities of less than 2500 population, "open country" and farms, and which amount to about 9,500,000 homes and farms, the extraordinary expansion of both housing and utility lines has caused an average increase of about 100,000 new customers per month, during 1946.

An analysis of customer gains throughout the country show that the largest expansion in new homes connected is in the South, especially in the West South Central group of states, which show a 7½ per cent increase. The East South Central, South Atlantic, Mountain, West North Central and New England follow, in order of rate of growth. The industrialized urban states north of the Ohio and east of the Mississippi show only relatively small increases.

GI's who planned, while in the service, to "be their own boss after the war," are doing it. "Small light and power" customers, which consist of stores, garages, filling stations, small industrial plants, etc., totaled 4,602,938 in July, 1946. This represents an increase of 310,119 customers or 7.2 per cent over the July, 1945, number of customers in this class, an extremely high rate of increase for this type of customer. New small businesses are being launched all over the country, no section being particularly favored above the others.

Despite shortages of electric appliances, the average use of kilowatthours per residential customer increased for the 12 months ending July, 1946, to 1295 kwhr, compared with 1191 kwhr used in the previous 12-month period. The average revenue per kilowatthour received by utility systems declined from 3.47c. to 3.29c. for this period.

PERCENTAGE INCREASE IN NUMBER OF ELECTRIC CUSTOMERS

FIRST EIGHT MONTHS OF 1946

Geographic Region	*In Homes*	*In Small Business*
New England	4 %	6 %
Middle Atlantic	1½%	4 %
East North Central	2½%	5 %
West North Central	4 %	3 %
South Atlantic	5½%	5 %
East South Central	7 %	6 %
West South Central	7½%	6 %
Mountain	5 %	5 %
Pacific	3 %	6 %
Total United States	3½%	4½%

New York Utility Council Is Organized

NEARLY 100 executives of electric and gas companies in New York State met at Saranac on Sept. 27 and 28 to hear discussions of various problems confronting the two industries. At the conclusion it was decided to call the group the New York State Utility Council and to meet informally from time to time. Robert E. Ginna,, vice-president of the Rochester Gas and Electric Corporation, was designated as chairman for the coming year with instructions to call a meeting when it was deemed necessary.

The sponsoring committee for the meeting was composed of: Ernest R. Acker, President, Central Hudson Gas and Electric Corporation; E. F. Barrett, President, Long Island Lighting Company; Robert E. Ginna, Vice-President, Rochester Gas and Electric Corporation; John Haley, President, Central New York Power Corporation; R. D. Jennison, President, N. Y. State Electric and Gas Corporation; B. G. Neilson, Vice-President, The Brooklyn Union Gas Company; A. T. O'Neill, President, Buffalo Niagara Electric Corporation; Otto Snyder, President, New York Power and Light Corp.

During the two days' session the following addresses were heard: "Helping Each Other With Common Problems," by Mr. Acker; "The Present Significance of the Gas Turbine and Atomic Energy in Future Power Plant Planning," by J. K. Salisbury, General Electric Company; "What's Ahead in Financing?", by Dr. Bartow Griffis, Manager of Utility Division, Standard and Poors Corp.; "How Free Should Free Servicing Be?", by G. L. Leibman, Director, Dealer Relations, Consolidated Edison Company of New York; "Economic Research As a Basis for Selective Load Building," by Constantine Bary, Rate Research Engineer, Philadelphia Electric Company; "The Legal Front," by T. Carl Nixon, Senior Partner, Nixon, Hargrave, Middleton and Devans, Rochester, N. Y.; "How to Keep Friends for the Utility," by E. R. Dunning, Vice-President, N. W. Ayer and Son; "Where Do We Stand?", by Albert F. Tegen, President, General Public Utilities Company.

Electrical Equipment Committee Meeting

C. A. Corney, *Chairman*

APPROXIMATELY 75 members and guests of the Electrical Equipment Committee were present at the Fortieth Meeting held at the New Ocean House, Swampscott, Massachusetts, on October 4 and 5.

In accordance with the customary practice of the committee, the morning of the first day was devoted to a closed session. The summary of the semi-annual Apparatus Trouble Report for the period February 15, 1946 to August 15, 1946, prepared by F. S. Brown, covered a total of 140 cases with an average of 23 per month as compared to an eight year average of 21. Lightning or lightning arresters, accounted for 22 per cent of the total number of failures reported compared to 20 per cent in the corresponding period in 1945. Of the troubles classified as major, those occurring most frequently were transformers (over 500 kva)—12, turbo generators—7, oil circuit breakers—4, exciters—3. Of those classified as minor, the most frequent were induction regulators—15, motors—9, transformers (constant current)—9, transformers (over 500 kva)—8. This report was followed by a characteristically active round table discussion of specific cases of trouble with various types of equipment.

R. W. Wilbraham discussed progress made since the last meeting by the Joint AEIC-EEI-NEMA Committee on Power Circuit Breakers. Simplification of circuit breaker rating tables and means of securing a better supply of spare parts for old circuit breakers are under study.

H. K. Sels stated that 25 cases of oil fires had been reported since October, 1945. Twelve of these fires involved transformers. The severity of many of the fires was limited by prompt use of extinguishing equipment.

A relatively simple method for calculating the expectancy of generator outage was presented by H. P. Seelye. The number of units, their capacity, per cent operating time, and experience record as to number and duration of forced outages were indicated as being the primary considerations in making the calculations. The results obtained by such a study can be used as a logical basis for engineering judgment in determining reserve requirements.

E. C. Brown presented a paper describing the accounting procedures used in the Connecticut Valley Power Exchange. The Exchange operates on a pool basis which makes possible the use of fundamentally simple accounting procedures. In 1945, a staff of nine was sufficient to operate the load control office on a 24-hour a day basis and, in addition, to account for 800 million kwhrs of interchange and primary power.

An abstract of foreign reports on developments in d-c transmission was given by H. A. Dryar. The design of adequate terminal equipment was indicated as being the primary problem connected with the tranmission of large blocks of power over long distances by d-c. Considerable savings in line construction were estimated to be obtainable by the use of d-c. The use of cable for d-c transmission appeared especially attractive since its cost is estimated to be only 1.2 times the cost of equivalent overhead transmission facilities.

A description of metal-clad switchgear at the Venice No. 2 station of the Union Electric Company was presented by C. C. Dodge. The third section of this station was planned in 1942 but construction was stopped by the War Production Board. In 1945, permission was granted to renew construction. The satisfactory experiences with 4000 and 5000 ampere air breakers, obtained in the first and second section of the station and improvements in design since that time, indicated that the use of this type of breaker in the third section to eliminate oil fire hazards, was desirable. The elimination of the oil fire hazard connected with the breakers, led to the consideration of metal-clad switchgear in lieu of the original plans for masonry construction. No structural changes in the building were required to accommodate the metal-clad equipment and a saving in floor space was effected through its use. Masonry fire walls between switchgear groups and gas tight bushings at walls and floors through which connections pass, are used to localize troubles. A lively discussion of the relative merits of masonry and metal-clad construction followed the presentation.

E. B. Shew discussed methods of training personnel in the techniques of making splices in wire and cable by the Construction Department of his company. Lesson sheets designed to be readily understandable were prepared with the assistance of the Personnel Research Department. The material is displayed in three columns, one of which discusses WHAT is to be done, the second column HOW and the third WHY. Improvements in splicing are expected as a result of the training.

Walker Cisler gave a talk entitled "Operation of Utility Systems in Europe During the War." Damage to generation facilities due to bombardment, bombing, and demolition was illustrated. The use of interconnection and emergency repairs to complement military developments was explained.

A summary of replies from questionnaires sent out concerning practices of cleaning and testing insulating oils was presented by E. S. Fitz. Di-electric, acidity, power factor, and color tests are the predominating methods used. Testing in both the field and shops is popular, but laboratory tests are preferred by many companies. The filter press method of cleaning is used by the majority of companies.

A report of On-The-Job Training for veterans of World War II was presented by C. L. Derrick, which will appear in an early issue of the BULLETIN. The State Trade School was utilized for the training, and a shortage of instructors was overcome by assigning certain personnel from his company to the school as instructors. So far 110 employees have enrolled in the course and it is expected that 90 per cent will complete it.

Regional groups have been organized on the basis of similar climatic conditions, to aid in the development of the heat pump, F. A. Lane announced, in making a progress report of this development. Specifications for equipment based on the heat pump principle for house heating and water heating have been prepared.

Arc welder rules issued by the State of Wisconsin were discussed by E. F. Dissmeyer on behalf of J. H. Foote. These rules appear to conform with the needs of operating companies in regard to minimizing flicker problems and transformer failures experienced in the past with the application of arc welders. In rural areas, the maximum permissible size of welders is 150 amperes.

Transmission and Distribution Committee Meeting

L. R. Gaty, *Chairman*

THE forty-first meeting of the Transmission and Distribution Committee was held on Oct. 7 and 8 at the Cavalier Hotel, Virginia Beach, Va., with 120 members and guests in attendance.

R. R. Habberley, Standards and Specifications Group Sponsor, reported considerable progress toward the preparation of joint EEI-NEMA standards for street lighting equipment and distribution fuses.

Substantial progress in preparation of specifications for secondary racks and clevises for strain insulators was reported by E. H. Kendall.

E. K. Karcher demonstrated a sample of the proposed EEI-NEMA standard mounting bracket for distribution fuse cutouts and distribution type lightning arresters and reported that the majority of companies commenting on the proposed bracket had voiced an enthusiastic approval.

A method of making low voltage overhead service cable connections to buildings was described by W. E. Losie. A service bolt for a messenger supporting the cable is supplied by the power company and installed by the electrical contractor.

R. N. Havourd reported good progress toward joint EEI-NEMA standardization of insulators. A substantial reduction in the number of insulator styles at present available as NEMA standards is planned in the new specification.

A. E. Silver indicated that the EEI-NEMA Joint Committee on Standards for Distribution Transformers has started preparation of standards for 100 to 500 Kva single-phase and 150 to 500 Kva three-phase transformers.

Subcommittee Reports

Three papers were presented by the Timber Products Subcommittee. L. J. Jacobi outlined tests on fir crossarms and emphasized the importance of local deviations of grain slope near the top or in the critical central section of the crossarm. T. A. Wilson discussed recommended pole practices with respect to specie and preservative treatment. In view of the general inexperience with miscellaneous conifers, companies were urged to keep service records of these species. F. A. Ashbaugh reported on the present status and availability of yellow pine crossarms indicating that they are comparable with fir both in strength and economy.

Corrosion was the subject of four papers presented on behalf of M. W. Ghen, Underground Group Sponsor. A report on the application and protective coatings on Bell System cables prepared by Robert Pope and J. J. Albano of the Bell Telephone Laboratories was presented by Mr. Pope. R. L. Featherley of the Dow Chemical Company discussed the use of magnesium anodes for lead cable sheath protection, indicating that this galvanic method is particularly applicable where corrosion is occurring in manholes normally filled with water, where overhead communications cables dip underground below streets and railroads, and in city localities where the "electrolytic" method with its higher, applied voltage may effect other nearby underground structures. The use of insulating joints in electrolysis control was outlined by J. J. Pokorny. Several examples were cited where the use of insulating joints was helpful in breaking up complex underground networks into smaller and simpler circuits, isolating the most seriously affected sections and permitting these sections to be treated as simple units; and purely as a device for controlling sheath currents. L. K. Yerger described experience with cable corrosion on the Buffalo Niagara System. G. B. McCabe gave a general discussion on corrosion in which he emphasized savings in maintenance resulting from cooperation through local electrolysis committees.

C. W. Pickells presented a report by J. E. McCormack, outlining the experience in operation and the progress in the design of askarel filled and dry type transformers.

The 1944 Cable Operations Report is now ready for printing and highlights of the report were reviewed by G. K. Tashjian.

L. F. Hickernell of the Anaconda Wire and Cable Company described a new high voltage rubber-like material which has been under test for the past two years and which promises to be a step forward in the high voltage rubber class of insulation.

A wide variety of subjects was covered by the General Engineering Group under the sponsorship of T. J. Brosnan. The session at the next meeting will be devoted entirely to system design.

Emergency Power Plans

W. A. Upham outlined a plan for coordinated effort by power and telephone companies in the restoration of their services after an emergency affecting a large number of customers of both. Lists of key personnel, maps, lists of priority customers and information on main feeder routes are interchanged at regular intervals. Upon the occurrence of an emergency, a coordinated survey of the damage is made on organized forms designed to show information required by each company. In general, restorations on the two plants will be made by the respective linemen. However, supplies will be interchanged as required, and pole replacements, removals and tree trimming will be made as necessary by either company regardless of custodianship.

Reports on storm damage in Detroit, Milwaukee and in upper New York State were presented.

A group of companies recently got together informally to find the causes for galloping conductors and to attempt to work out some possible remedies. Several cases under study were reviewed, indicating that the phenomenon appears to be no respector of weather, tension or wire size.

A. E. Silver gave a progress report of EEI-Bell System activities on joint facilities for rural power and telephone service. Studies and trials have progressed to the point where it can be stated that in many cases substantial economies can be effected by the joint use of poles for power and telephone circuits in rural areas. The use of telephone carrier on the power circuit offers much promise for sparsely settled territory. Present emphasis is directed toward obtaining a wider participation in trial installations. The Joint Subcommittee on Rural Telephone Service by Carrier on Power Circuits has recently issued for field trial, mutual practices covering the installation and maintenance of carrier equipment and good

progress is being made on five preproduction carrier installations. F. W. Nimmer reported that the Joint Subcommittee on Joint Use of Poles for Rural Power and Telephone Circuits has issued for field trial mutual practices for long span joint construction and is now studying the economies of joint use. Eleven trial installations have been initiated.

O.K. on Utility Radio

H. P. Seelye reviewed a recent FCC order establishing a new radio communications service for power utilities. Previously, operation was restricted to the handling of emergency calls but the Commission now recognizes that full operational use, including the use of mobile units, may prevent the occurrence of emergencies. Frequency assignments for this new service are being made on a temporary basis pending the adoption of a final frequency allocation plan. See article by E. D. Glatzel in September, 1946, issue of E.E.I. BULLETIN.

A paper by E. W. Oesterreich on inrush currents experienced when distribution feeders are re-energized was presented by L. M. Olmsted. These currents are chiefly a function of the percentage of motor loads and the diversification of the motor operations. Apparently the only solution available today which will permit increasing the percentage of motor load or raising the diversification of the automatically controlled motor load beyond the present limit defined by the ability to re-establish circuit load by reclosing the feeder breaker, is to provide for the subdivision of the distribution circuit into load areas small enough so that the total diversified and undiversified loads are below the tripping values of the circuit protective devices. It was suggested that it might be practicable to develop pole mounted contactors or switches with controls which will open the switch after a predetermined period of voltage interruption and then reclose, with sufficient time delay after voltage is re-established to the supply side of the switch. L. N. Gosinski urged that other companies initiate test programs not only to corroborate present data but also to obtain the characteristics of inrush currents on rural type distribution circuits.

Power company members of the AEIC-EEI-NEMA Joint Committee on Motor Starting Currents have been asked by the NEMA representatives whether present NEMA standards for locked rotor currents for 220 volt, three-phase motors are satisfactory and this question will shortly be referred to members of the Transmission and Distribution Committee by questionnaire. As an aid in formulating answers, J. W. Anderson presented data on comparative flicker characteristics of single-phase and three-phase overhead secondaries.

L. M. Olmstead presented a paper by G. B. Dodds indicating the necessity for performance records as a basis in studying improved service continuity on distribution systems. A multitude of protective methods have been tried to clear faults faster and more reliably and many methods of construction have been tried to reduce the number of faults. A joint working group of the Relay and Distribution Subcommittees of the AIEE is attempting to assemble data on the performance of distribution systems with these various means of protection and methods of construction in order to determine the most effective schemes. Preliminary surveys indicate that existing service records are meager and incomplete and that the methods of reporting are so varied that existing data cannot be correlated effectively. Therefore an effort is being made to establish a simple uniform system of reporting and it is hoped that this system will be accepted by the industry in general.

Two methods of determining load on distribution transformers were presented. Perry Shelley described an office record method using basic data obtained from 11 meter installations operated continuously over a 12-year period and now kept up-to-date by five such installations. J. W. Anderson described an actual transformer test method utilizing primary side metering and involving annually the test of about 30 per cent of the overhead and 23 per cent of the underground transformers installed on the system.

Capacitor Interference

Two cases of telephone interference produced by the installation of capacitors on 4 kv feeders were discussed. C. T. Malloy described a case involving joint use exposure which indicated the need for a more effective telephone transposition scheme than the "exposed line" system employed in this exposure. G. E. Dean described a situation involving the installation of a very large number of three-phase capacitor banks where the coordinative measures involved the application of a number of neutral reactors and the use of improved types of telephone subscriber sets.

The program of the Overhead Group sponsored by H. E. Stites was devoted chiefly to lightning protection of transmission lines and to hot line maintenance.

Lightning Protection Studies

A. E. Silver presented an analysis of induced voltage of shielded lines on high steel towers. Induced surges on conductors due to lightning strokes to towers and shield wires usually are not large enough to cause flashover of line insulation but with span lengths in excess of 600 ft they may cause flashover at terminals with lower insulation levels, especially if the terminal is a reflection point. In any case the energy in these surges is relatively small and may be discharged satisfactorily by lightning arresters. G. E. Tennant reviewed the performance record of a 115 kv wood H-frame line indicating that the impulse strength of wood structures alone is not sufficient to maintain satisfactory service in the presence of lightning. The addition of an overhead ground wire and buried counterpoise has resulted in close to a perfect operating record. L. M. Olmsted presented a six-year operating record of transmission lines reconstructed for improved performance under lightning conditions by raising the overhead ground wire to provide better shielding, installing an underline ground wire to improve the coupling, reducing ground resistances and in certain cases replacing steel arms with wood. The reduction in tripouts closely approximated that predicted in design.

Two movies and a series of slides depicting hot line maintenance were shown. L. M. Olmsted presented a film showing the routine maintenance of pole top air break switches on a 22 kv line, and F. M. Fuller displayed slides showing similar maintenance on a 12 kv line. E. Hansson presented a movie showing the replacement of a 20 insulator suspension string on a 220 kv line.

F. J. Raps presented a series of slides showing various labor-saving devices including a gin pole arrangement for handling large mercury vapor street lamp fixtures, an insulated jumper and jack arrangement for use on distribution cutouts, rigging gear for mounting large cutouts on cross arms and a gas engine driven tool for driving steel channels for reinforcing pole butts with a power takeoff for drilling bolt holes through the channels.

E.E.I. Transportation Committee Meets with A.G.A. Motor Vehicle Committee

By Jean Y. Ray
Chairman, EEI Transportation Committee

A JOINT meeting of the EEI Transportation Committee and the Motor Vehicle Committee of the A.G.A. was held in Atlantic City, Oct. 8 and 9, to collaborate the work of the two committees on public utility motor vehicle operation and maintenance. A subcommittee, with Robert H. Clark of Consolidated Edison Company of N. Y. as chairman, was set up to prepare plans and a program for a public utility fleet operators' conference to be held in Cleveland, April 14-15, 1947. In addition to Mr. Clark, members of this committee include S. G. Page, Equitable Auto Company, Pittsburgh; Linn Edsall, Philadelphia Electric Company, C. A. Collins, Washington Gas Light Company; J. R. North, Commonwealth and Southern Corporation, H. A. Peterson, American Gas and Electric Service Corporation, and W. H. Mann, Toledo Edison Company.

It was also decided to set up permanent subcommittees to cover chassis selection and application, body standardization, tools and equipment, maintenance, fuels and lubricants, and driver and mechanic training. The selection of the chairmen and personnel of these committees was left in the hands of J. Y. Ray, chairman of the Transportation Committee, and B. D. Connor, chairman of the A.G.A. Motor Vehicle Committee.

A general discussion of present day operating and maintenance problems developed the fact that most utility companies had received only a very small percentage of new vehicles for which orders had been placed. It was also brought out that the general condition of new vehicles and chassis that had been received indicated lack of careful work on assembly lines and that instances where vital parts were improperly adjusted or missing were not uncommon. This condition seems to apply to the products of the large vehicle manufacturers and indicates that neither the factory or dealer organizations are checking the vehicles properly before delivery. Under these circumstances, the joint committee recommended that all utility companies carefully check and inspect all new vehicles as soon as they are received and before they are put in service.

The discussion also developed the fact that the manufacturers of truck chassis have a sufficient number of orders on hand to cover two years of production and that these vehicles will be in short supply for at least that long. Batteries and many replacement parts such as gears and bearings are also very hard to obtain and the quality of many parts that are available is very poor. It will be necessary to rebuild many old vehicles that have passed the point at which they are usually replaced in order to have a sufficient number of units available for use. The joint committee recommended that the attention of all utility company employees be directed to the necessity for safe and careful operation of all vehicles since any damage may result in a vehicle being laid up for several days or weeks due to the scarcity of the necessary repair parts.

Wisconsin Utility Accountants Convention

MORE than 150 key accountants of electric, gas and transportation companies in Wisconsin attended the first exclusive accounting convention in five years of the Accounting Section of the Wisconsin Utilities Association held in Milwaukee Sept. 19 and 20, benefiting everyone who participated, whether he was an accountant or a chief executive.

Technical reports setting forth the research work carried out by five committees comprised the program of the first day's session. Addresses on subjects appealing for greater interest in the fight to preserve the American personal opportunity system; a second on personnel and labor problems; a third on nationwide accounting activities; and a fourth on better ways to write business letters, made up the second session. The entire second day was devoted to round table discussions conducted by separate companies.

At the concluding session Otis Gerke, treasurer, Wisconsin Power & Light Co., was elected chairman to succeed Paul J. Imse, assistant secretary, Milwaukee Gas Light Co. L. M. La Porte, Milwaukee, controller, Wisconsin Electric Power Co., was elected vice-chairman.

One of the highlights of the convention was the address by B. E. Miller, Madison, president of the Wisconsin Utilities Association, and secretary of the Wisconsin Power & Light Co., who pointed out the necessity for counteracting the efforts of communists and their dupes in their efforts to stir up unrest and distrust in the nation and discredit the operations of the American personal opportunity system.

He also criticized what he termed the propaganda attempts of some national cooperative leaders to smear electric companies for aiding universities in conducting research to develop new and more efficient uses of electric service on farms.

Paul Imse, Milwaukee, chairman of the Section stated that present economic and political situations, plus inability to obtain productive labor and mechanical facilities, have made the job of the accountant more valuable than heretofore. Present conditions, he said, require company managements to demand more instructive data to aid them in formulating policies and plans. The need for interchange of accounting information among companies has become much greater than ever before, he said.

Harold P. Taylor, Vice President and Treasurer, Wisconsin Public Service Corporation and chairman of the Accounting Division of the Edison Electric Institute, ably outlined some of the principal subjects electric and gas accountants in other sections of the nation are thinking about.

In discussing general thinking on "functional accounting," he concluded that this subject will be crystallized and that some practical suggestions will be made as to the definition of the term "functional accounting" and whether or not it can be applied in actual practice and be effective in controlling costs without adding unduly to accounting costs.

Taylor clearly indicated the activities

that are going on with reference to taxation, costs of accounting processes, setting up of a classification of sections of a mortgage to make it easier to carry out its provisions, greater consideration by specialists, top management and accountants to employee relations and customer relations.

D. W. Faber, reporting as chairman of the special committee on the revision of the Classification of Accounts, presented the progress that has been made in discussions with A. R. Colbert, Chief, Accounts and Finance Department of the Public Service Commission.

Fred Rauch, Vice President, Cincinnati Gas & Electric Co., informatively traced the history of the labor union movement. He asserted that the maintenance of satisfactory labor relations is a full time job across the entire company organization, requiring the earnest attention of the most competent minds in a company and in the industry.

Indiana Electric Association Annual Convention

AT THE annual convention of the Indiana Electric Association held in the French Lick Springs Hotel, French Lick, Indiana on September 25th, 26th and 27th, the Directors elected D. C. Hess, Vice President in Charge of Operations for the Indianapolis Power & Light Company, President for the coming Association year. He succeeds Arnold Hogan, Vice President of the Indiana & Michigan Electric Company, Marion, Indiana, whose administration of Association affairs was lauded by the Directors as being most constructive and inspiring to the industry. C. K. Graham, Southern Indiana Gas & Electric Company, Evansville, Indiana, was elected Vice President of the Association and E. F. Hauser, Indianapolis, Secretary-Treasurer.

The Honorable Ralph F. Gates, Governor of Indiana, in delivering the address at the convention banquet praised the Association for its financial support of the State Department of Commerce and Public Relations National Advertising Program to attract new industries to the State. He also praised cooperation of the electric utilities in the war time blackout program and other activities.

Included in the program for the opening session, in addition to reports by Officers on Association activities, were discussions by W. C. Johnson, Vice President of the National Electric Manufacturers Association and Allis-Chalmers Manufacturing Company and Joseph C. Bevis, Vice President of the Opinion Research Corporation, Princeton, N. J. Mr. Johnson reviewed the close cooperation between the equipment manufacturing industry and the electric utility companies during the past and stressed the need for continued cooperation in the future. Mr. Bevis reported on studies of the Opinion Research Corporation which have demonstrated clearly that American people essentially are fair minded and believe heartily in the democratic principles upon which this country was built. A special feature on the first day was the showing of a variety of motion pictures of interest to electric utility people.

Opening the second business session E. R. Ambrose, American Gas and Electric Service Corporation, discussed developments and research in the coming field of electric home heating. Lee H. Hill, Publisher of the *Electrical World*, followed with a paper covering personnel, industrial relations, and labor trends of definite interest to the electric industry. P. L. Smith, President of the National Association of Electric Companies, outlined the aim and objectives and the work being done by the N.A.E.C. Grover C. Neff, recently elected President of the E.E.I. attended the convention and, when introduced to the audience, stressed the need for full cooperation between various industry associations stating that no duplication of effort existed.

At the closing business session Clarence A. Jackson, Executive Vice President of the Indiana State Chamber of Commerce called the attention of the delegates to the trends in Social Security as they exist today and Carl Taylor, President of the Waukesha State Bank, Waukesha, Wisconsin stressed the need of continued vigilance if freedoms are to be preserved in the America of tomorrow.

Association President, Arnold Hogan, acted as presiding officer at the first business session; Vice President, D. C. Hess, at the second; F. B. Culley, Vice President of the Southern Indiana Gas and Electric Company at the annual banquet and Dean H. Mitchell, Vice President of the Northern Indiana Public Service Company at the third and last business session. The Committee on Arrangements was composed of R. A. Gallagher, President of the Public Service Company of Indiana, F. B. Culley, Vice President of the Southern Indiana Gas and Electric Company and J. G. Mooney, Vice President of the Indiana and Michigan Electric Company, South Bend. The Committee on Nominations for Officers was made up of H. T. Pritchard, President of the Indianapolis Power & Light Company, Dean H. Mitchell, Vice President of the Northern Indiana Public Service Company and C. V. Sorenson, President of the Indiana Service Corporation.

Special programs for ladies attending the convention, a feature of which was a Fashion Review, had been arranged.

During the convention special meetings of Directors and Association Standing Committees were held for organization purposes and for the completion of plans covering Association activities during the coming year.

Plans for Edison Centennial Gather Momentum

(*Continued from page* 355)

Lions and other service organizations.

The national committee has available material to help make these local observances sparkle with interest.

In all its activities, the national committee has kept constantly in mind that the theme of the Centennial is, as stated by Mr. Kettering, the "Public's Equity in Edison." In its broader application this theme becomes the public's equity in all science and industry, and the promotional materials and events planned by the committee will carry out the basic theory that America's greatness is essentially the product of a system which encourages enterprise and rewards creative thinking.

RECENT EDISON ELECTRIC INSTITUTE PUBLICATIONS

DISTRIBUTION TRANSFORMERS

EEI-NEMA Joint Committee on Standards for Distribution Transformers — Third Report.

EEI Pub. 0-5. A report of the Joint Committee of the Edison Electric Institute and National Electrical Manufacturers Association on Standards for Distribution Transformers, 16 pages. Price $.50 to members and their employees; $.70 to non-members and foreign countries.

THIS Third Report establishes design standards for certain mechanical and electrical features of three-phase, pole type distribution transformers rated 150 kva and smaller, high voltage 15,000 volts and below, low voltage 600 volts and below. The committee, organized to develop standards for the entire range of single-phase and three-phase distribution transformers, has published two earlier reports. The first covered single-phase, pole-type units, of 25 kva and smaller; the second extended single-phase ratings through 100 kva. The committee plans to carry on its work both with respect to ratings on which reports have been issued, and on additional ratings within its scope.

The three-phase standards described in the Third Report cover mechanical features of both vertical and horizontal transformer types, and also match those of the single-phase type for all ratings. They provide for maximum mounting interchangeability among three-phase ratings, and also among the three- and single-phase ratings, according to the committee. Reduction of field costs from simplified installation and increased operating convenience, and reduction of manufacturing cost through simplification and unification of practice will result, it is expected.

Many parts already in production for single-phase transformers now being built to follow the committee's Second Report will be put to use in three-phase transformers, which will follow the new design, and will thus speed the availability of three-phase transformers. Manufacturers are preparing to proceed with designs in accordance with the Third Report.

The new standards coordinate many of the important mounting dimensions and locations of essential parts among the three-phase and single-phase units. The three-phase specifications incorporate many parts identical with the single-phase, assuring maximum convenience and a minimum stock of maintenance parts, in addition to speeding the manufacture of three-phase transformers.

Important items duplicated in construction for three- and single-phase ratings are Type A, Type B and Type C support lugs, low-voltage bushing and terminal construction, high- and low-voltage terminal openings, ground pad, nameplate pad and extension, oil level markings, provision for drain plugs, T-crossarm hangers, kickers, and adapter plates for direct pole mounting of the larger ratings.

Drawings of mounting arrangements, LV connectors, auxiliary supports, support lugs, etc., feature the report, with detailed descriptions of the standards for electrical and mechanical features which are established.

ELECTRIC WATER HEATER SPECIFICATIONS

Model Specifications for the Instaliation of Wiring and Plumbing of Automatic Electric Storage Water Heaters.

EEI Pub. 0-4. A report by the Electric Water Heating Committee, Residential Section, Commercial Division of the Edison Electric Institute, 9 pages. Price $.25 a copy to members and their employees, to non-members and to foreign countries.

THESE specimen model specifications have been prepared as an aid to electric operating utilities in preparing their own wiring and plumbing installation specifications for storage water heaters. The committee's primary objective is to provide: (a). a general installation specification based on well accepted practices for use as a guide by those utilities desiring to prepare printed specifications for the first time; (b). a check list or guide for those utilities which may have occasion to modify their existing installation specifications.

It is impossible to write a specimen which would conform precisely with every type of service rendered by utilities throughout the country, and at the same time have one that is simple enough to be usable. In the interest of a practical presentation, this guide is based on certain assumed conditions and practices which seem to be prevalent in the industry. Companies with practices differing from those used in this example will find it desirable to select those provisions which are applicable to their situation and make whatever changes seen necessary in those provisions which do not pertain.

Conditions and practices assumed for this purpose are:

Service at 240 volts.
Outdoor meters.
Separate meter rate applied to water heating service.
EEI-NEMA water heater equipment standards.
Two-element heaters with time control applicable to lower element only.
Interconnected thermostats to prevent simultaneous operation of lower and upper elements.
Customer permitted to retain tempering tank.

Also, in preparing these specifications it has been assumed that dealers will merchandise water heater equipment and handle all contractual relations concerning the installation directly with the contractor. In some cases, however, the company may elect to deal directly with customer and contractor, and in such instances specifications should be modified accordingly.

It is emphasized that this specimen is *intended only as a guide* and that its contents do not represent recommendations as to type of service, rates, distribution standards or installation practices.

Reaffirmation of Inch-Millimeter Conversion

(*Continued from page* 352)

once in every three years an American Standard shall be reviewed by the correlating committee under whose jurisdiction it belongs, with a view to reaffirmation or revision. The American Standard on Inch-Millimeter Conversion was established by the general acceptance method. Its approval by the ASA was based on a wide canvass of organizations interested, in which no adverse comments were received.

The essence of the standard is that the conversion ratio 25.4 between the inch and the millimeter is recommended for industrial use. The British Standards Institution has approved a similar standard so that now the ratio 25.4 has practically become a world standard.

No sign of disagreement with this recommendation has been received during the period the American Standard has been in existence.

PERSONALS

Consumers Power Company has recently announced several changes in its division headquarters organization.

HUBERT G. HOLMES has been appointed superintendent of the western division with headquarters at Grand Rapids. He succeeds LeRoy L. Benedict, who was promoted several months ago to assistant general supervisor of production, transmission and construction for the company.

ARTHUR L. CRAWLEY and JOHN R. THOMSON are advancing from positions as assistant managers to managers, the former succeeding F. A. BEARD at Flint and the latter SAMUEL BALL at Bay City. Mr. Beard has retired after 46 years of service and Mr. Ball after 42 years of service with the company.

DAVID H. GERHARD has been transferred from the Alma division to Saginaw, succeeding FRED C. COPE who has resigned because of ill health. HERBERT L. ZIEGENHEIN is advanced to division manager at Alma to succeed Mr. Gerhard.

GEORGE F. STECKER has retired after being associated with Consumers through almost its entire history. His service record covered more than 56 years. ARTHUR R. HAMILTON succeeds Mr. Stecker as general superintendent of construction of electric plants and substations.

W. R. WOLFE, on November 15 becomes assistant to vice president of the Oklahoma Gas and Electric Company with headquarters in the general office.

A member of OG&E since 1926 and manager of the Eastern Division since 1942, he brings to his new assignment a broad knowledge of company policies and operations gained in 20 years spent in various engineering, sales and managerial posts throughout the organization.

He holds a B. S. degree and an E. E. degree in electrical engineering from the University of Oklahoma, where he won honors in athletics. Is a past president of the Oklahoma Society of Professional Engineers and a vice president of the National Society of Professional Engineers. Has been active at Muskogee in civic and Masonic work.

Also promoted in the Oklahoma Gas and Electric Company last month were JOHN T. NAYLON who becomes manager of the Eastern Division; E. D. FREEMAN, who was appointed manager of the El Reno District; C. E. BATHE who assumed the position of superintendent of the transmission department; RALPH THORNTON, who became superintendent of engineering; BRYCE BRADY, who was appointed distribution engineer by Ralph Thornton.

Mr. Naylon, except for a military leave of five years, has been manager of the El Reno district since 1923. He joined OG&E 27 years ago in the gas department at Muskogee, shortly after his graduation from the University of Michigan. Was later transferred to the sales department at Oklahoma City, going to El Reno as local manager in 1923.

Mr. Freeman as a member of OG&E for nearly 30 years, steps into managerial responsibilities with a broad background of operating experience. He joined the gas department at Oklahoma City in May 1917, upon graduation from the University of Oklahoma, from which he received a B. S. degree in electrical engineering. Transferred a month later to the electric department, he served in various engineering and supervisory capacities in Oklahoma City, Sapulpa and Shawnee until 1933 when he was named superintendent of the electrical department, which, in 1936, became the transmission and distribution department.

Mr. Bathe has been a member of OG&E for 19 years, coming to OG&E from the faculty of the Engineering School at the University of Oklahoma on July 15, 1927. He was superintendent of standards in charge of the electrical laboratory for nine years and was instrumental in the early organization of a radio department before joining the transmission-distribution department in 1936 as electrical engineer, still in charge of the laboratory. He was named superintendent of engineering in 1941.

Mr. Thornton, while a student at OU, began his company career in May, 1923 as a draftsman in the Norman office. He worked part time and during summer vacations until his graduation in May, 1925, with a B. S. degree in electrical engineering. He has served in various engineering capacities, including division engineer at Sapulpa and Fort Smith. He became distribution engineer for the general office engineering department in 1941, which office he has since held with the exception of two and a half years' absence in the Army.

Mr. Brady began with the OG&E in May, 1923, while at OU, working in the line and engineering departments at Oklahoma City the first year and at Norman the next three years. Upon his graduation in 1927, with a B. S. degree in electrical engineering, he went to the northern division, where for six years, beginning a year after his arrival, he was division engineer and for seven years assistant division superintendent. The past five years in Oklahoma City he has served in a number of engineering capacities, including that of wartime supervisor of priorities and being "loaned out" twice—as consultant for utility interests in Mexico and to lay out distribution systems for both naval bases at Norman, Okla.

WILLIAM B. GOUDEY, who has completed 28 years' service with the New York State Electric & Gas Corp., will retire this fall as vice president and Binghamton division manager. In accepting Mr. Goudey's retirement, R. D. Jennison, president of the company, announced a series of managerial and other promotions. WILLIAM H. MCELWAIN, Elmira division manager, will become Binghamton division manager. HOMER H. CHAPMAN, eastern division manager, will succeed Mr. McElwain. DAVID A. LEWIS, operating superintendent of the western division, will become eastern division manager. JACK S. MCMULLEN, operating superintendent of the Perry-Hornell district, will succeed Mr. Lewis.

Mr. Goudey, whose career in the electrical field began 48 years ago, became operating superintendent of the Binghamton Light, Heat & Power Company in 1918. Appointed vice president and general manager of the Binghamton Light Heat and Power Company in 1925, he subsequently became manager of the enlarged Binghamton division of the New York State Electric & Gas Corp. He was elected vice president in 1940. Mr. McElwain entered the company's employ in 1926 and Mr. Chapman in 1925. Affiliating himself with

the company in 1925, Mr. Lewis was named operating superintendent of the western division in 1941. Mr. McMullen became identified with the utility in 1931.

EDWARD J. BRILL of Hazleton, Pa., has been appointed director of the employee relations department recently organized by the Pennsylvania Power and Light Company. Mr. Brill started his career in the electric industry with the Columbia and Montour Electric Company, predecessor of Pennsylvania Power and Light in that area. After holding a variety of operating positions, in 1935 he was named assistant to the superintendent of system operation. From 1940 until 1943, he worked on special studies, and became assistant to the superintendent of operation, devoting all his time to wage negotiations and related employee matters.

GEORGE L. ROSENBERGER, electrical engineer with the Virginia Electric & Power Company, Richmond, has retired, bringing to a close a career of more than 30 years in the electrical development of northern Virginia. Mr. Rosenberger has been with Virginia Electric & Power and predecessor companies since 1924. He was superintendent of public utilities for Manassas from 1914 to 1920 and for two years thereafter, was superintendent of the Herndon Light & Supply Company. In 1922 as general superintendent of the Fairfax and Loudon Light and Power Company he built the first transmission line between Alexandria and Leesburg, opening up to rural electrification one of the state's richer farming regions. Mr. Rosenberger is a member of the A. I. E. E.

J. H. VIVIAN, formerly protection engineer, Southern California Edison Company, Los Angeles, has been appointed electrical and maintenance engineer for the company.

JAMES B. COOK, who has been associated with the Cincinnati Gas and Electric Company for 24 years, has been given charge of the structural section of the general engineering department to succeed C. RUSSELL DOLE, resigned. During his association with the company, Mr. Cook handled the structural design for many major projects. Mr. Dole relinquished his duties with the Cincinnati utility after an association of 19 years to join the Dayton Power and Light Company.

J. U. BENZIGER, superintendent of Plant Atkinson of Georgia Power Company, has been transferred to Albany as superintendent of construction to take charge of construction of the company's new 45,000 kw steam electric generating station. He has been succeeded by L. B. LOCKLIN, who has served at Plant Atkinson since January, 1931, as chemist, production engineer and resident engineer.

STUART WILLSON, division manager, Northern States Power Company, Faribault, Minn., has been elected president of the North Central Electric Association.

A graduate of the University of Minnesota, Mr. Willson started in the sales department, Minneapolis office, Northern States Power Company, was transferred to St. Cloud sales in 1925 and to LaCrosse in 1926. In 1940 he was appointed manager of the Montevideo division and of the Faribault division three years later.

JOHN J. DALY has been appointed retail sales manager of the Connecticut Light and Power Company, Waterbury, succeeding the late William M. Walsh. Mr. Daly was former commercial manager of the company's southern division and lately has been sales promotion manager. He will be responsible for the staff planning phases of retail market development, and will be assisted by Charles A. Byron, newly appointed appliance manager, in charge of appliance sales and the preparation of sales plans. Mr. Byron has been assistant merchandising manager.

J. O. TOBEY, superintendent of the Pacific Gas and Electric Company, electrical division at Sacramento, California, has retired after 45 years' service in the power field. Mr. Tobey's electrical career began in Shasta County in 1901 as a lineman with Keswick Light and Power Company, which later was absorbed by P. G. & E. From 1909 until 1918 he was power division superintendent in Sacramento, after which he supervised the city transportation system until 1943. His successor in the electrical division will be W. L. Hill, superintendent of lines for P. G. & E.

ALLAN B. CAMPBELL, for twenty years an engineer on the staff of Edison Electric Institute and its predecessor, has been appointed executive secretary of the National Association of Corrosion Engineers, Houston, Texas.

An electrical engineering graduate of the University of Illinois, Mr. Campbell was on the faculty of Iowa State College from 1915 to 1920. He then served for three years as electrical engineer with the Iowa Railroad Commission. He joined the National Electric Light Association in 1923, as an engineer. Following dissolution of NELA in 1933, Mr. Campbell was appointed an engineer on the staff of the Institute.

Mr. Campbell's principal work with NELA and EEI was in the field of codes and standards, transmission and distribution, and accident prevention. He served as secretary of the Transmission and Distribution, and Accident Prevention Committees of the Institute for a number of years.

Mr. Campbell became the eastern representative of Hughes Brothers, Seward, Nebraska, manufacturers of wood cross-arms, in 1943. He left this company to take his present position.

In his new post, Mr. Campbell will guide the work of the association, which is made up of individuals engaged in controlling corrosion of metallic structures, and organizations concerned with this problem.

He is a Fellow of the American Institute of Electrical Engineers, and a member of the American Wood Preservers Association and the American Society of Safety Engineers.

LEWIS D. RILEY has been appointed manager of the Chester County Light and Power Company, to succeed the late Jesse F. Potts. His office will be at Kennett Square, Pa.

Mr. Riley, who has been in the public utility business since 1912, was born at Rock Springs, Md. He is well-known in this section, having lived for many years in Lancaster and Chester counties. His wide experience in the Utility business has included assignments in electric construction work, substation operation, power dispatching, and electric metering.

Mr. Riley spent several months in Kennett Square earlier this year substituting for Mr. Potts during the latter's illness, and made many new friends in Chester County in that period.

Prime Objective—Good Public Relations

(*Continued from page* 350)

how slowly he grasps each new phase. Because of the selling and service job he'll have to do, he is given thorough instruction in the working of all appliances, how to repair small appliances and diagnose minor troubles of large appliances, how to replace fuses and explain their method of operation, and a working knowledge of residential wiring.

When he's ready to take over his area, all customers in his area are sent a letter of introduction. That letter contains the photograph of the representative and an explanation of the services which he will render. The customer is even given the representative's home telephone number, in case he can't be reached at his office.

The letter starts an introduction:—

"We hope you will consider Mr. Blank as your friend, as well as your Monongahela Power Company representative, in all matters pertaining to your electric service. He will see that any questions you may have, which he cannot answer, will reach the proper person for prompt answer."

Not a 'Soft' Job

The job specification points out that his prime objective is to establish good customer relations and to encourage load growth. But it goes on to say he's responsible for meter-reading, collections, handling of customer complaints, minor appliance repairs, promotional programs, selling small appliances and the securing of prospects for major appliance sales. He is even expected to cooperate in civic enterprises, taking a part in community organization.

The job is not one for a "softy." He may be required to assist in delivering and placing major appliances, such as refrigerators and ranges. He covers his area afoot and, like the postman, "neither rain nor snow nor storm . . ." shall stop him.

Customers are taking to the idea, judging from letters and personal expressions received in the company's offices. It is early yet to measure the success of the idea in dollars and cents. There still are some "bugs," to be sure. There is a feeling now that 900 customers is too many for one man to cover satisfactorily. A smaller area will permit more thorough coverage, but on the whole the plan is proving more than satisfactory. It is quite likely it will be expanded into all divisions of the company's territory.

The urban representative, it might be added, operates only in urban residential areas and not in districts where commercial users predominate. Small commercial customers in residential areas are covered by the representative. For the rural customers, the company has had a similar plan in effect for a number of years, except that the rural, or District Representative as he is known, is required to have a working knowledge of farms and be able to talk the farmer's language.

CONVENTIONS AND MEETINGS

1946

NOVEMBER

6-8	Southeastern Electric Exchange, General Sales Conference, Atlanta Biltmore Hotel, Atlanta, Ga.
7-8	National Farm Electrification Conference, Sherman Hotel, Chicago, Ill.
7-8	Pennsylvania Electric Association, Systems Operating Committee, Sky Top Lodge, Sky Top, Pa.
8	Oklahoma Utilities Association, Electric Light and Power Division, Biltmore Hotel, Oklahoma City, Okla.
12-15	National Association of Railroad and Utilities Commissioners, Hotel Biltmore, Los Angeles, Cal.
13	Electric Companies Advertising Program, Management Group Meeting, New York, N. Y.
14-15	Pennsylvania Electric Association, Communications Committee, Benjamin Franklin Hotel, Philadelphia, Pa.
22-23	New Jersey Utilities Association, Seaview Country Club, Absecon, N. J.

DECEMBER

2-3	Prime Movers Committee, EEI, New York, N. Y.
2-6	The American Society of Mechanical Engineers, Hotel Pennsylvania, New York, N. Y.

1947

JANUARY

13-15	Canadian Electrical Association, annual winter conference, Chateau Frontenac, Quebec City, Que.
27-31	American Institute of Electrical Engineers, New York, N. Y.

FEBRUARY

3-4	Prime Movers Committee, EEI, Van Curler Hotel, Schenectady, N. Y.
10-11	Transmission and Distribution Committee, EEI, Atlanta Biltmore Hotel, Atlanta, Ga.
12-13	Electrical Equipment Committee, EEI, Atlanta Biltmore Hotel, Atlanta, Ga.

MARCH

3-5	Canadian Electrical Association, Western Conference, Vancouver, B. C.

APRIL

March 31-April 3	Thirteenth Annual Sales Conference, EEI, Edgewater Beach Hotel, Chicago, Ill.
7-9	AGA-EEI National Accounting Conference, Hotel Statler, Buffalo, N. Y.
28-30	Engineering Committees, EEI, Edgewater Beach Hotel, Chicago, Ill.

MAY

5-9	National Electrical Wholesalers Association, Hotel Traymore, Atlantic City, N. J.
27-29	National Association of Purchasing Agents, Chicago, Ill.

JUNE

2-5	EDISON ELECTRIC INSTITUTE, Annual Meeting, Atlantic City, N. J.
18-20	Canadian Electrical Association, 57th Annual Convention, Algonquin Hotel, St. Andrews, N. B.

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Codes and Standards (a Subcommittee of the Board of Directors), H. B. BRYANS....Philadelphia Electric Co., Phila., Pa.

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